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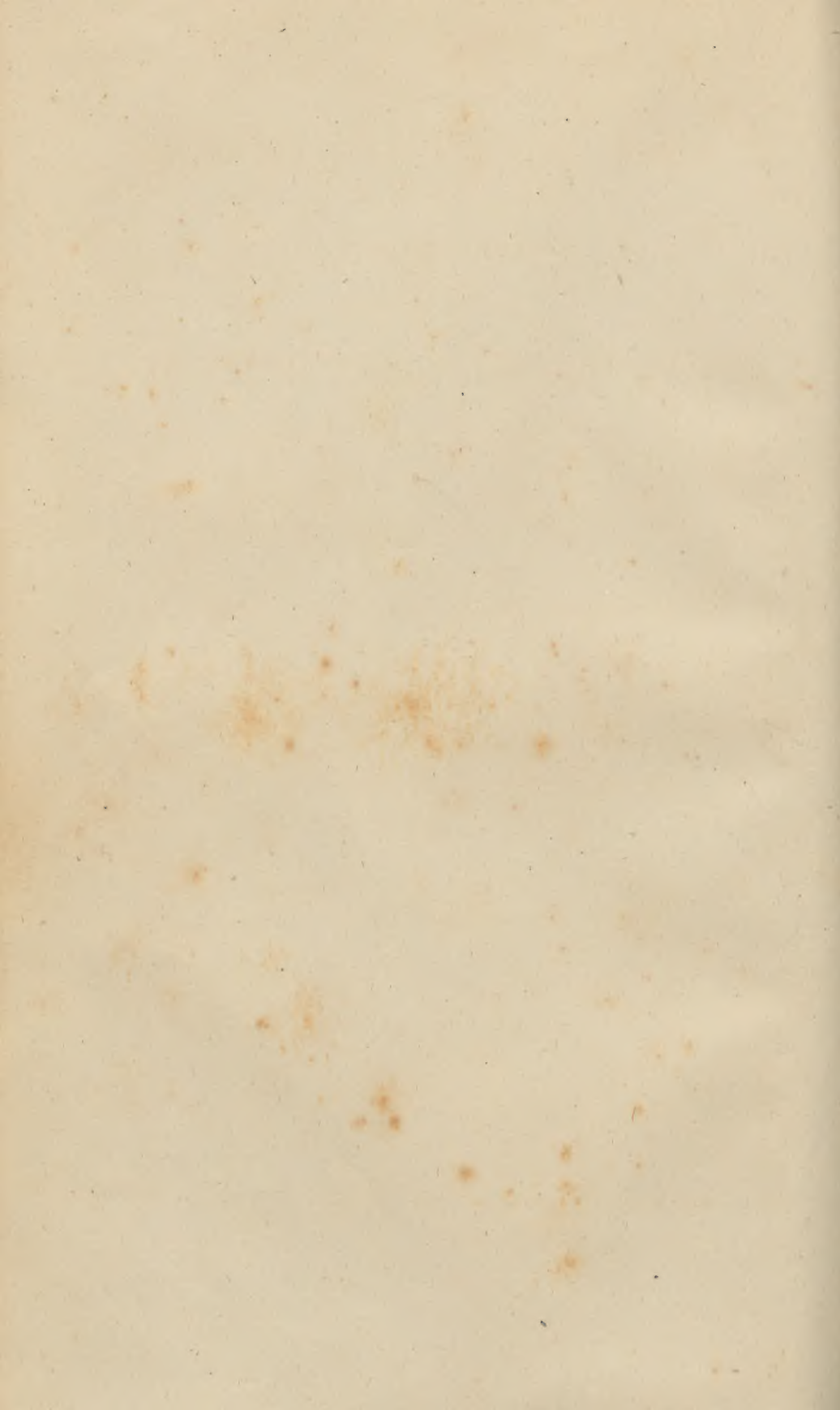
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BARE BOOK



FLORA AUSTRALIENSIS:

A DESCRIPTION

OF THE

PLANTS OF THE AUSTRALIAN TERRITORY.

BY

GEORGE BENTHAM, F.R.S., P.L.S.,

ASSISTED BY

FERDINAND MUELLER, M.D., F.R.S. & L.S.,

GOVERNMENT BOTANIST, MELBOURNE VICTORIA.

VOL. I.

RANUNCULACEÆ TO ANACARDIACEÆ.

PUBLISHED UNDER THE AUTHORITY OF THE SEVERAL GOVERNMENTS
OF THE AUSTRALIAN COLONIES.



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1863.

FLORA AUSTRALIENSIS

A DESCRIPTION

OF THE

PLANTS OF THE AUSTRALIAN TERRITORY.

BY

GEORGE DUNSTON, F.R.S., &c.

WITH

EXPLANATIONS BY J. E. TAYLOR, F.R.S., &c.

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TO

SIR WILLIAM JACKSON HOOKER, K.H.,

D.C.L. OXON., F.R.S., ETC. ETC.,

DIRECTOR OF THE ROYAL GARDENS, KEW,

TO WHOSE UNCEASING EXERTIONS IN THE CAUSE OF SCIENCE

IT IS MAINLY DUE THAT

THE PREPARATION OF A SERIES OF COLONIAL FLORAS

HAS BEEN SANCTIONED,

WHOSE LIBERALITY IN OPENING TO THE USE OF BOTANISTS THE EXTENSIVE

HERBARIUM AND LIBRARY HE HAS COLLECTED,

HAS CONTRIBUTED SO ESSENTIALLY TO THE WORKING THEM UP, AND

TO WHOM THE AUTHOR FEELS ESPECIALLY INDEBTED FOR THE

MOST FRIENDLY AND CONSTANT ENCOURAGEMENT AND ASSISTANCE

DURING FORTY YEARS OF HIS BOTANICAL CAREER,

This Work is Dedicated

AS

A TOKEN OF THE SINCEREST ATTACHMENT AND RESPECT.

PREFACE.

For a general view of the progress of botanical discovery in Australia, and an enumeration of the Botanists, Navigators, Travellers, Collectors, or Residents who have supplied the materials for describing its Flora, or have published more or less of their descriptions, I must for the present refer to the valuable Essay on the Flora of Australia, prefixed by Dr. J. D. Hooker to his 'Flora of Tasmania.' Should life be spared to me to bring the present work to a conclusion, I purpose, with the last volume, to give a sketch of the labours of all those who, to my knowledge, have contributed to the investigation of the vegetation of Australia. But, in the meantime, I would mention in a few words, the principal sources from which I am now enabled to draw materials for the present Flora.

The chief foundation of the work may be said to be the vast herbarium of SIR WILLIAM J. HOOKER, with a few smaller collections under his charge at Kew. I need not here repeat the detail of the rich stores of Australian plants it contains, enumerated in Dr. Hooker's Essay, but I cannot forbear thus early expressing my acknowledgment of the liberality of the arrangements sanctioned by Sir William for the admission of botanists to these collections, for which he has made so many sacrifices, and amongst which I have been enabled to work as if they were my own, with the free use of one of the most extensive practical botanical libraries. Here also I have had the benefit of continual friendly assistance from DR. J. D. HOOKER, Assistant Director of the Royal Gardens, and from PROFESSOR D. OLIVER, Librarian, who have invariably allowed me to consult them upon all points of difficulty which have arisen; from MR. A. BLACK, the intelligent and zealous Curator, whose activity, combined with a very great knowledge of plants, has brought the herbarium into such a state of order that few of the additions which are continually arriving remain many months without being laid into their

places; and from MR. W. HEMSLEY, a young but able assistant, who has carefully checked my proofs with the herbarium as they have issued from the printer's hands. The value of this herbarium for a work like the present, is also greatly increased by the notes and determinations it contains from the hands of various botanists who have worked in it, and especially of DR. PLANCHON, who had examined and corrected the determination of a large portion of the specimens it contained during several years that he had the charge of it. But the importance of this herbarium, will be best appreciated by the consideration that it contains specimens of almost every species described in the present work.* The very few exceptions will be found to be specially noted by a reference to the herbarium in which I have seen them, given in a parenthesis after the habitat, or by an indication of the sources whence the description has been derived.

To my friend MR. J. J. BENNETT, the Head of the Botanical Department of the British Museum, I am indebted for the important and essential aid derived from the inspection of the Australian herbarium of the late ROBERT BROWN. This extraordinary collection, the main foundation of our knowledge of Australian vegetation, would be alone sufficient to show the powers of observation, the sagacity, the zeal, and industry of that eminent man, dwelt upon by Dr. Hooker, in the above-mentioned Essay. He seems during his short visits often almost to have exhausted the Flora of the points he touched at; his specimens are gathered with great judgment, and there still remain in his herbarium, in most cases, several of each species in an excellent state of preservation, and detailed descriptive notes on them all were made at the time. These specimens, now the property of Mr. Bennett, have been kindly brought by him successively to the British Museum for my use, where I have also been allowed to consult Mr. Brown's notes. Two or three small parcels have been unfortunately mislaid, but of those I have in some cases found specimens in a duplicate set laid out for the Banksian herbarium.

In the Banksian herbarium I have verified several species of which the types are there deposited, and inspected several of the original specimens of BANKS and SOLANDER, of which some, gathered above ninety years back, have never yet been published. Whilst at the British Museum, I should also gladly have availed myself of the valuable Australian collections there hoarded,—and certainly nothing can exceed the obliging

* All the specimens examined for the present work (often very numerous) are marked in the Hookerian herbarium in red ink.

readiness with which Mr. Bennett gives every assistance to those who come to visit the Botanical Department, and to myself in particular,—but the system now so long pursued by the managing trustees is one which interferes much with the use of those collections which, like Herbaria, are made for the purposes of science, not for the public gaze. It would appear as if the whole object were to accumulate stores, without caring to make them available for use. The rich herbaria collected at the public expense by the late A. Cunningham in his various expeditions under Captain King and others, by the Officers of the ‘Beagle’ under Captain Wickham and Captain Stokes, and many others either presented to the Museum or purchased out of the annual grants, have been stored away, many of them from a quarter to half a century, unarranged in their original parcels, without any thought of providing the staff and funds necessary to render them of use to scientific botanists. No system of separating duplicates for making exchanges has, I believe, been adopted. And for those who wish to work in the Botanical Department, notwithstanding the readiness of the officers to afford them every assistance, the want of a practical botanical library in the department, the regulations preventing the use of any apparatus for heating water, and the defective construction of the room as to light, are serious drawbacks.

With regard to the late A. CUNNINGHAM’s plants, however,—a collection second only to R. Brown’s in the influence it has had, by its variety and extent, on our knowledge of Australian Botany,—I have, I believe, been able to examine the whole of them. Besides the nearly complete set deposited in the Hookerian herbarium, Mr. R. HEWARD, to whom Mr. Cunningham’s private herbarium, containing the set he had reserved for himself, had been left, on hearing that I was engaged in the preparation of the present work, most generously presented the whole of his plants to the Kew herbarium, in order that I might there have the free use of them.

Another herbarium of which I have always had the free use, is that of my friend Dr. LINDLEY, who, for the last thirty-five years, has ever been ready to afford me every assistance in my botanical works. I had already received from him, at the time, nearly complete sets of the plants of the late Sir WILLIAM MITCHELL’s various expeditions; and I have now examined, in Dr. Lindley’s own herbarium, the very few types of these or of other Australian plants published by him, which may have been wanting in the Hookerian herbarium or in my own, now part of the national collection at Kew.

I have found in the herbarium of the late Sir JAMES E. SMITH, now

the property of the Linnean Society, the types of the Australian species described by him, chiefly in Rees's *Cyclopædia*.

With the few Australian species described from the herbarium of the late A. B. LAMBERT, I have had much difficulty. At his death the preparation of his collections for sale was so ill-managed, that it is very difficult to ascertain where any particular portions of it may now be deposited. A few have found their way to the Kew herbaria, many were purchased for Berlin and St. Petersburg, and other distant Continental towns; some were, I believe, bought by the British Museum, and are still lying among their unarranged collections; and some others, but, as I understand, not the Australian portion, are in the Fielding herbarium at Oxford. I have, therefore, in most instances been obliged to rely chiefly on circumstantial evidence for the identification of such of these plants as are only known by the brief diagnoses of G. Don and others.

Of the important and extensive West Australian collections of Mr. JAMES DRUMMOND I have had for examination complete sets of excellent specimens in the Kew herbaria, and in the majority of instances I have seen them in different sets so as to check the one with the other. I have thus been enabled to identify nearly the whole of the species published by TURZANINOW in the 'Bulletin de la Société Impériale des Naturalistes de Moscou.' As these collections are very generally distributed, I have quoted the numbers attached to the specimens where I could do it with any certainty. Unfortunately there is much confusion in some of these numbers, Mr. Drummond having recommenced a fresh series with each of the five collections he sent over, besides one or two supplementary sets. The first collection, of which many were published by Lindley and others, were not originally numbered, but numbers were afterwards added in a few additional sets sent home. In the Hookerian herbarium, owing to the belief at the time that these numbers were not certain enough for quotation, they were often not preserved; in most instances where they are kept there is no indication of which series they belong to, and in other herbaria I have often found them referred to a wrong series. These numbers cannot therefore be relied on absolutely for identification without checking them by descriptions.

To Dr. O. W. SONDER, of Hamburg, Dr. Harvey's able collaborator in the 'Flora Capensis,' I have to offer my best thanks for the liberality with which he transmits to me for examination the whole of his Australian herbarium,—an invaluable aid, inasmuch as it comprises a nearly complete series of typical specimens of the *PLANTÆ PERSIANÆ*. As many portions of that rich collection were considered for publication

to such botanists as the late Dr. Steudel, it would have been impossible to identify them without such an inspection of authentic specimens. This herbarium contains also several authentic specimens of Labillardière and some other French botanists, and often also several of the plants sent over by Dr. F. Mueller, of which he himself had kept fragments only or nothing at all. I find also specimens authentically named by Steetz, Bartling, Schlechtendal, and other German botanists.

Thanks to the liberality with which the late P. B. WEBB distributed his duplicates, I have seen in various herbaria the majority of LABILLARDIÈRE'S plants; but as there were several others, described in the first volume of De Candolle's 'Prodromus' and other works, from the herbarium of the Jardin des Plantes, about which I had some doubts, I paid a visit, in January last, to Paris, where I met, as usual, with every attention on the part of the gentlemen connected with the establishment. I there verified these doubtful species up to the end of *Rutaceæ*, which I had then completed, and since then, my friend M. A. BRONGNIART, as the head of the botanical department of the museum, has most obligingly transmitted to me notes and flowers for examination of a few species belonging to the subsequent Orders.

With regard to the originals of the species described in BARON HUEGEL'S 'Enumeratio Plantarum' and other works, published at Vienna, I was enabled to bring over with me specimens of several, especially of those which I had myself described, and I have identified many others by means of specimens compared with the Vienna types. Those published from F. BAUER'S collections occur necessarily also in R. Brown's herbarium; and when I have had any doubts as to any of the remaining ones, they have been cleared up by full notes communicated to me by my friend DR. FENZL, Director of the Imperial Garden and Herbarium.

There remains for me to mention the very essential assistance received from the distinguished Government Botanist of Victoria, DR. FERDINAND MUELLER. His extensive journeys and important labours during the first ten years of his residence in Australia, have been adverted to by Dr. Hooker in the above-mentioned Essay. Since that time, his botanical explorations have been chiefly in the Victorian mountains and in the neighbourhood of Twofold Bay and Cape Otway, whilst his zeal, talent, and indefatigable industry have been still more fully exemplified in the various publications which have issued from the Melbourne press. Not to mention minor papers or reports on expeditions, we have a first volume of an elaborate illustrated quarto Flora of Victoria, under the title

of 'The Plants indigenous to the Colony of Victoria,' and three octavo volumes, all but complete, of 'Fragmenta Phytographiæ Australiae,'—comprising above a thousand detailed descriptions of plants, whose general accuracy will bear the test of a very close examination. When indeed it was first contemplated to bring out a general Flora of Australia under Government sanction, Dr. Mueller was naturally looked to as the botanist the best qualified for undertaking the task of preparing it; and in the hope that it would be entrusted to him, he had devoted his utmost energies to collecting the necessary materials. But there was one indispensable step, the examination of European herbaria where the published types were deposited, which he was unable to take; and it is a signal proof of the generosity of his disposition and the absence of all selfishness, that when it was proposed to him that the preparation of the Flora should be confided to me, on account of the facilities which my position here gave me for the examination of the Australian collections I have mentioned above, he not only gave up his long-cherished projects in my favour, but promised to do all in his power to assist me, a promise which he has fulfilled with the most perfect faith. A joint work was at first thought of, but, independently of the ordinary drawbacks attending on joint works, the distance which separates us, requiring four months to obtain an answer to every trivial doubt or query, put this quite out of the question. I alone am therefore responsible for the details of this work, for the limitation given to genera and species, for their characters and description. But important observations have been frequently suggested by the published works of Dr. Mueller, or by his manuscript notes, which he has freely communicated; and a still more essential and generous contribution to the work has been the loan of the very rich herbarium he had amassed for the Australian Flora, which he remits to me in instalments. One beneficial result to science of the course he has thus pursued is that there will be for future reference duplicate authentic specimens here and in Australia of the great majority of Australian species.

This herbarium comprises chiefly:—

1. The specimens collected by Dr. Mueller himself in the course of his extensive land-journeys in Australia (upwards of 20,000 miles), as well as during his residence in Victoria. Of one important portion of these plants, the North Australian collection, the set in the Hookerian herbarium is better and more complete than his own. Dr. Mueller at that time did not contemplate the publications he has since undertaken, and with his usual generosity he wrote to Sir W. J. Hooker, in 1857,

"You receive always the whole of the specimens of every rare kind, nothing of many species having been retained at all, or I satisfied myself with a solitary leaf, or flower, or fruit in many cases; . . . the plants being so much more useful at Kew than in Australia. All my wishes are concentrated upon the point to discharge my duties faithfully and to the satisfaction of the Government." (Hook. Kew Journ. ix. 195.) So also of several of those which he had in early days collected in the north as well as in Victoria and in South Australia, he sent the best specimens to Dr. Sonder for description and publication in Germany, and unfortunately, a great proportion of the principal botanical treasures of the northern expedition were destroyed by damp in the 'Messenger.' But of the results of Dr. Mueller's subsequent herborizations his herbarium contains good, instructive, and well-preserved specimens.

2. The collections made during various exploring expeditions in the interior of Australia, and entrusted to Dr. Mueller for determination or publication. These are necessarily, from the difficulties attending these expeditions, although highly interesting as to species, often fragmentary or unsatisfactory as specimens. Among the most important of them are those of Mr. BABBAGE's expedition to the north-west interior of S. Australia, of Mr. AUGUSTUS GREGORY's expedition to Cooper's Creek, and of Mr. E. FITZALAN, in LIEUT. SMITH's expedition to the estuary of the Burdekin, all specially reported on by Dr. Mueller; of Mr. J. M'DONALL STUART, who, notwithstanding the obstacles opposed by the arduous nature of his journey, appears never to have neglected Natural History; and the collections made by Mr. PEMBERTON WALCOTT and Mr. MAITLAND BROWN, in Mr. FRANCIS GREGORY's expedition to the north-west. As I have not been able always to make out from the labels which of these two gentlemen actually gathered the specimens, I have generally quoted them as the results of Mr. Gregory's expedition. The herbarium also contains some specimens from Mr. LANDBOROUGH's expeditions, and to this class I should perhaps add a large number of the late Dr. LEICHHARDT's plants, entrusted to Dr. Mueller on loan by the trustees of the Sydney Museum on the proposition of Sir WILLIAM DENISON. These were chiefly collected in the back country from Moreton Bay during two years previous to his celebrated expedition, together with a few saved from the general wreck of the plants of that expedition. I have also seen a few of Dr. Leichhardt's specimens in the herbarium of the Paris Museum.

3. Collections made by gentlemen more or less employed as collectors for the botanical department at Melbourne, among whom, those who

have most contributed to the herbarium are :—Dr. H. BECKLER, who first collected for himself in the country to the back of Moreton Bay, and afterwards for Melbourne in the jungle-forest about the Hastings, Richmond, Macleay, and Clarence rivers, and, still more recently, between the Darling and the Barrier range, as botanist and surgeon to Burke's unfortunate expedition; his specimens are remarkably good and well selected. MR. J. DALLACHY, whose principal journey was one to the Darling desert. MR. G. MAXWELL, from whom there are numerous species from W. Australia, chiefly from the southern districts. MR. C. STUART, who collected in Tasmania, and afterwards more largely in New England, in the neighbourhood of Tenterfield. A considerable set of the latter has also been presented to the Kew herbarium by SIR STUART DONALDSON; MR. F. WATERHOUSE, who made large collections for the Government of S. Australia, chiefly in Kangaroo Island; and MR. AUGUSTUS OLDFIELD, an acute observer as well as an intelligent collector, who, besides the Tasmanian contributions mentioned in Dr. Hooker's Flora, made large additions to the West Australian plants previously known; in the first instance from the neighbourhood of Murchison river, and afterwards from the south-western districts. Mr. Oldfield is now in this country, and has most generously offered the use of his own Australian herbarium to the Kew Museum, as a contribution towards the present Flora.

4. Collections presented to Dr. Mueller by friends chiefly resident in Australia. These, owing to the greater facilities for drying and preserving enjoyed by stationary collectors, are usually the most satisfactory to the working botanists. The first of them in importance are those of MR. C. MOORE, Superintendent of the Botanic Garden at Sydney, and of MR. W. HILL, Superintendent of the Botanic Garden at Brisbane; the former chiefly from the northern districts of New South Wales, and the latter from the vicinity of Moreton Bay. Amongst the numerous amateur contributions, I notice those of MR. W. ALLITT from Portland, of MISS LOUISA ATKINSON from the Blue Mountains, of DR. H. BEHR (now in California) from South Australia, of MR. E. BOWMAN from Queensland, of MR. J. NERNST (unfortunately, from a misreading of the labels, spelt *Vernet* in the first sheets of this volume) from Ipswich, of MR. A. THOZET from Queensland, of MR. W. VERNON from Sydney, of the REV. W. WHAN from Shipton, of MR. C. WILHELM from Port Lincoln, of the REV. S. E. WOODS from the Tattiarra country, and of MR. W. WOOLLS from Paramatta.

Besides the above-mentioned names and those enumerated in Dr.

Hooker's Essay, some others may be found quoted in the present work in connection with species they have collected. To supply any omissions I may have inadvertently made, and in the hope of doing full justice to all who may have directly or indirectly contributed to the investigation of the Australian Flora, it is my purpose, with the last volume to give a general alphabetical list, with a sketch of their labours, of all those whose collections are deposited in the public or private herbaria to which I have access.

With regard to the form and language adopted in the present work, they are those which, after much consideration, were adopted and sanctioned by Sir W. J. Hooker for colonial Floras in general, and exemplified in the 'Flora Hongkongensis.' I may therefore here repeat what I then stated, that it has been my endeavour to follow out the principles laid down in the "Outlines of Botany" prefixed to each of these Floras, so as to facilitate as much as possible the finding out the name of any plant gathered in the territory, by the comparison of specimens with the descriptions given. For this purpose, although I cannot yet give an analytical key to the Orders, until at least the *Polypetalæ* shall have been gone through, the genera of each Order, and the species of each genus, are universally preceded by analytical tables, in which their more prominent characters are contrasted. These tables may be considered as another form for the short diagnoses of Linnæus and his immediate followers, or for the italicized portions of many modern diagnoses, and can refer only to the differentiation of known species. It is the vain attempt to introduce characters which might absolutely distinguish a species from all others to be hereafter discovered,—to contrast the known with the unknown,—that has occasioned those long and tedious diagnoses, which render many modern descriptive works almost unmanageable. A long description in the ablative absolute, supposed to contain the essential characters only, and another in the nominative with the accessory ones, often fail in their purpose, for some of the most striking features, such as stature, dimensions, colour, etc., because they are less absolute than the others, are conventionally considered as accessory; and the descriptions containing them are usually first glanced over by the botanist seeking to name a plant, before he wades through the confused mass of ablatives in which he is to find the important characters. In my descriptions, therefore, which I have been obliged to shorten as much as consistent with their practical use, I have endeavoured to select the characters most important to observe for their identification. Many of these descriptions are, I am aware, as yet very

imperfect, and some may be in some respect erroneous, especially with regard to stature, colour, and dimensions, owing to the insufficiency of specimens and the want of reliable memoranda by those who have seen the plants in a living state. Travellers, therefore, making use of this work in the country, will have to guard against attaching much importance to discrepancies in characters which dried specimens cannot show, when the descriptions apply well to the plant they are examining as to form and structure. With regard to dimensions, especially, it must be borne in mind that those here given are the average limits between which the organs vary in their full-grown normal state. Starvation, inordinate luxuriance, the imperfect development of the first- or last-formed organs of each kind, and other similar circumstances, may reduce or extend the dimensions beyond the limits assigned, but the general aspect of the specimens, if tolerably good, will generally indicate whether the organs are or not in any such abnormal conditions.

With regard to the synonymy, I have endeavoured to give a complete reference to all published names of endemic Australian plants, as well as to all names which have been specially given with reference to Australian specimens. But in the case of well-known extra-Australian species extending into our Flora, I have thought it unnecessary to repeat the whole of the synonyms, already given in the general works I have quoted, adding only such new ones as my researches for the identification of Australian species have enabled me to verify.

In order to facilitate the use of this work as a separate Flora of each of the colonial territories whose Governments have supported it by separate grants, I have thought it right to indicate by a prominent typographical arrangement the particular colonies in which each species is to be found. For this purpose I have considered Queensland as extending (as indicated in our most recent maps) to Cape York, and have designated under the general name of North Australia the whole of the unsettled territory to the westward within the tropics. Sharks Bay and its neighbourhood are considered as belonging to West Australia; and I have taken as the northern limits of South Australia, the 26th parallel S. latitude, as I find it marked in our maps.

In giving the various stations at which each species has been found, it has been my plan to enumerate all those I find in R. Brown's herbarium, all Cunningham's except the Tasmanian ones, and generally all others that I find authentically recorded on labels accompanying the specimens, excepting where many collectors have gathered the same plant at such well-known localities as Port Jackson, King George's

Sound, etc., in which case I have mentioned only R. Brown, or some others of those who first collected it, and excepting also Tasmania and Victoria. For the two latter colonies, I have usually extracted or abridged the stations (always verified on the specimens) given in the elaborate Floras of J. D. Hooker and F. Mueller.

Many of the varieties which I have indicated will be considered as distinct species by a large number of general botanists; on the other hand, there are many forms which I have adopted as species which Dr Mueller is disposed to reduce. In some cases I have yielded to his opinion, rather against the conclusion I should have come to from the examination of dried specimens, because, for Victoria plants especially, he has the great advantage of observing them living in their native stations. Having had myself much experience in describing plants both with and without this aid, and of testing descriptions made with and without it, I can fully appreciate the great use that can be made of it, provided due caution be observed, for it often acts as a snare. It rarely occurs that many species of a genus are found together so as to admit of comparison in a growing state, and we are too apt in regard to them to trust to recollections of general impressions. I do not consider it safe therefore to unite forms usually regarded as distinct and appearing so in a large number of specimens from a great variety of stations, on account of generally observed variations unconfirmed by specimens, nor even on account of single apparently intermediate specimens, unless the history of such abnormal specimens is ascertained. Little as we know, for instance, of the influence of natural hybridizing in Europe, it has been still less, if ever, observed in Australia; and many other causes may have produced apparent passages between species really distinct. I have, therefore, wherever there is a difference of opinion between Dr. Mueller and myself, adopted the conclusion which has appeared to me the most probable, and mentioned the objection to it for the consideration and, if possible, the decision of future botanists.

At the moment of sending these pages to press, several additional collections have arrived at Kew from Dr. Mueller, from Mr. Oldfield, and from Mr. B. Lowrie. Were I to delay the publication of this volume for the purpose of inserting any additions they might supply, it is probable that others again might come to hand, and to such delays there would be no limit. As it is probable, also, that the first use of this volume may be the means of detecting many errors or inaccuracies, I think it better to reserve all "Addenda and Corrigenda" for a Supplement, to be issued with the second volume. •

I should here have added an introductory sketch of the geography of Australian vegetation and of the history of its botany; but the need for it is for the present obviated by the elaborate review contained in Dr. Hooker's above-mentioned Essay. It is true that recent discoveries as well as a more careful examination of the Australian species previously deposited in our herbaria, may require some corrections in the statistical details given, or slight modifications, as to the proportions in which the Australian Flora is connected with those of other countries; but the general features of its geographical distribution, so ably sketched out by Dr. Hooker, are only confirmed as further research renders them more definite, and the minor corrections may be much more satisfactorily given with the close of the work, when the whole Flora shall have been gone through.

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INTRODUCTION.

OUTLINES OF BOTANY, WITH SPECIAL REFERENCE TO LOCAL FLORAS.

CHAP. I. DEFINITIONS AND DESCRIPTIVE BOTANY.

1. The principal object of a **Flora** of a country, is to afford the means of *determining* (i. e. ascertaining the name of) any plant growing in it, whether for the purpose of ulterior study or of intellectual exercise.

2. With this view, a Flora consists of descriptions of all the wild or native plants contained in the country in question, so drawn up and arranged that the student may identify with the corresponding description any individual specimen which he may gather.

3. These descriptions should be *clear, concise, accurate, and characteristic*, so as that each one should be readily adapted to the plant it relates to, and to no other one; they should be as nearly as possible arranged under *natural* (184) divisions, so as to facilitate the comparison of each plant with those nearest allied to it; and they should be accompanied by an *artificial key* or index, by means of which the student may be guided step by step in the observation of such peculiarities or *characters* in his plant, as may lead him, with the least delay, to the individual description belonging to it.

4. For descriptions to be clear and readily intelligible, they should be expressed as much as possible in ordinary well-established language. But, for the purpose of accuracy, it is necessary not only to give a more precise technical meaning to many terms used more or less vaguely in common conversation, but also to introduce purely technical names for such parts of plants or forms as are of little importance except to the botanist. In the present chapter it is proposed to define such *technical* or *technically limited* terms as are made use of in these Floras.

5. At the same time mathematical accuracy must not be expected. The forms and appearances assumed by plants and their parts are infinite. Names cannot be invented for all; those even that have been proposed are too numerous for ordinary memories. Many are derived from supposed resemblances to well-known forms or objects. These resemblances are differently appreciated by different persons, and the same term is not only differently applied by two different botanists, but it frequently happens that the same writer is led on different occasions to give somewhat different meanings to the same word. The botanist's endeavours should always be, on the one hand, to make as near an approach to precision as circumstances will allow, and on the other hand to avoid that prolixity of detail and overloading with technical terms which tends rather to confusion than clearness. In this he will be more or less successful. The aptness of a botanical description, like the beauty of a work of imagination, will always vary with the style and genius of the author.

§ 1. *The Plant in General.*

6. The **Plant**, in its botanical sense, includes every being which has *vegetable life*, from the loftiest tree which adorns our landscapes, to the humblest moss which grows on its stem, to the mould or fungus which attacks our provisions, or the green scum that floats on our ponds.

7. Every portion of a plant which has a distinct part or *function* to perform in the operations or phenomena of vegetable life is called an **Organ**.

8. What constitutes *vegetable life*, and what are the functions of each organ, belong to *Vegetable Physiology*; the microscopical structure of the tissues composing the organs, to *Vegetable Anatomy*; the composition of the substances of which they are formed, to *Vegetable Chemistry*; under *Descriptive and Systematic Botany* we have chiefly to consider the forms of organs, that is, their *Morphology*, in the proper sense of the term, and their general structure so far as it affects classification and specific resemblances and differences. The terms we shall now define belong chiefly to the latter branch of Botany, as being that which is essential for the investigation of the Flora of a country. We shall add, however, a short chapter on *Vegetable Anatomy and Physiology*, as a general knowledge of both imparts an additional interest to and facilitates the comparison of the characters and affinities of the plants examined.

9. In the more perfect plants, their organs are comprised in the general terms **Root, Stem, Leaves, Flowers, and Fruit**. Of these the three first, whose function is to assist in the growth of the plant, are *Organs of Vegetation*; the flower and fruit, whose office is the formation of the seed, are the *Organs of Reproduction*.

10. All these organs exist, in one shape or another, at some period of the life of most, if not all, *flowering plants*, technically called *phanogamous* or *phanerogamous plants*; which all bear some kind of flower and fruit in the botanical sense of the term. In the lower classes, the ferns, mosses, fungi, moulds or mildews, seaweeds, etc., called by botanists *cryptogamous plants*, the flowers, the fruit, and not unfrequently one or more of the organs of vegetation, are either wanting, or replaced by organs so different as to be hardly capable of bearing the same name.

11. The observations comprised in the following pages refer exclusively to the flowering or phanogamous plants. The study of the cryptogamous classes has now become so complicated as to form almost a separate science. They are therefore not included in these introductory observations, nor, with the exception of ferns, in the present Flora.

12. **Plants** are

Monocarpic, if they die after one flowering-season. These include *Annuals*, which flower in the same year in which they are raised from seed; and *Biennials*, which only flower in the year following that in which they are sown.

Caulocarpic, if, after flowering, the whole or part of the plant lives through the winter and produces fresh flowers another season. These include *Herbaceous perennials*, in which the greater part of the plant dies after flowering, leaving only a small perennial portion called the Stock or Caudex, close to or within the earth; *Undershrubs*, *suffrutescent* or *suffrutescent* plants, in which the flowering branches, forming a considerable portion of the plant, die down after flowering, but leave a more or less prominent perennial and woody base; *Shrubs* (*frutescent* or *fruticose plants*), in which the perennial woody part forms the greater part of the plant, but branches near the base, and does not much exceed a man's height; and *Trees* (*arborescent* or *arborescent plants*) when the height is greater and forms a woody trunk, scarcely branching from the base. *Bushes* are low, much branched shrubs.

13. The terms *Monocarpic* and *Caulocarpic* are but little used, but the other distinctions enumerated above are universally attended to, although more useful to the gardener than to the botanist, who cannot always assign to them any precise character. Monocarpic plants, which require more than two or three years to produce their flowers, will often, under certain circumstances, become herbaceous perennials, and are generally confounded with them. Truly perennial herbs will often commence flowering the first year, and have then all the appearance of annuals. Many tall shrubs

and trees lose annually their flowering branches like undershrubs. And the same botanical species may be an annual or a perennial, a herbaceous perennial or an undershrub, an undershrub or a shrub, a shrub or a tree, according to climate, treatment, or variety.

14. Plants are usually *terrestrial*, that is, growing on earth, or *aquatic*, *i.e.* growing in water; but sometimes they may be found attached by their roots to other plants, in which case they are *epiphytes* when simply growing upon other plants without penetrating into their issues, *parasites* when their roots penetrate into and derive more or less nutriment from the plant to which they are attached.

15. The simplest form of the part of a plant, the *main*, consists of—

(1) The **Root**, or descending axis, which grows downwards from the stem, divides and spreads in the earth or water, and absorbs food for the plant through the extremities of its branches.

(2) The **Stem**, or ascending axis, which grows upwards from the root, bears and bears first one or more leaves in succession, then one or more flowers, and finally one or more fruits. It contains the tissues or other channels (217) by which the nutriment absorbed by the roots is conveyed in the form of *sap* (192) to the leaves or other points of the surface of the plant, to be *elaborated* or *digested* (218), and afterwards redistributed over different parts of the plant for its support and growth.

(3) The **Leaves**, usually flat, green, and horizontal, are variously arranged on the stem and its branches. They *elaborate* or *digest* (218) the nutriment brought to them through the stem, absorb carbonic acid gas from the air, exhaling the superfluous oxygen, and returning the assimilated sap to the stem.

(4) The **Flowers**, usually placed at or towards the extremities of the branches. They are destined to form the future seed. When perfect and complete they consist: 1st, of a *pistil* in the centre, consisting of one or more *ovules*, each containing the germ of one or more seeds; 2nd, of one or more *stamens* outside the pistil, whose action is necessary to *fertilize* the pistil or enable it to ripen its seed; 3rd, of a *perianth* or *floral envelope*, which usually encloses the stamens and pistil when young, and expands and exposes them to view when fully formed. This complete perianth is double: the outer one, called *Calyx*, is usually more green and leaf-like; the inner one, called the *Corolla*, more conspicuous, and variously coloured. It is the perianth, and especially the corolla, as the most showy part, that is generally called the flower in popular language.

(5) The **Fruit**, consisting of the pistil or its lower portion, which persists or remains attached to the plant after the remainder of the flower has withered and fallen off. It enlarges and alters more or less in shape or consistence, becomes a *capsule*, enclosing the seed until it is ripe, when it either opens to discharge the seed or falls to the ground with the seed. In popular language the term *fruit* is often limited to such seed-vessels as are or look juicy and eatable. Botanists give that name to all seed-vessels.

16. The herbaceous perennial resembles the annual during the first year of its growth; but it also forms (usually towards the close of the season), on its *stock* (the portion of the stem and root which does not die), one or more *buds*, either exposed, and then popularly called *eyes*, or concealed among leaves. These buds, called *leaf-buds*, to distinguish them from *flower-buds* or unopened flowers, are future branches as yet undeveloped; they remain dormant through the winter, and the following spring grow out into new stems bearing leaves and flowers like those of the previous year, whilst the lower part of the stock emits fresh roots to replace those which had perished at the same time as the stems.

17. Shrubs and trees form similar leaf-buds either at the extremity of the branches, or along the branches of the year. In the latter case these buds are usually *axillary*, that is, they appear in the *axil* of each leaf, *i.e.* in the angle formed by the leaf and the branch. When they appear at any other part of the plant they are called *adventitious*. If these buds by producing roots, become distinct plants before separating from the parent, or if adventitious leaf-buds are produced in the place of flowers or seeds, the plant is said to be *viviparous* or *proliferous*.

§ 2. *The Root.*

18. **Roots** ordinarily produce neither buds, leaves, nor flowers. Their branches, called *fibres* when slender and long, proceed irregularly from any part of their surface.

19. Although roots proceed usually from the base of the stem or stock, they may also be produced from the base of any bud, especially if the bud lie along the ground, or is otherwise placed by nature or art in circumstances favourable for their development, or indeed occasionally from almost any part of the plant. They are then often distinguished as *adventitious*, but this term is by some applied to all roots which are not in prolongation of the original radicle.

20. **Roots** are

fibrous, when they consist chiefly of slender fibres.

tuberos, when either the main root or its branches are thickened into one or more short fleshy or woody masses called *tubers* (25).

taproots, when the main root descends perpendicularly into the earth, emitting only very small fibrous branches.

21. The stock of a herbaceous perennial, or the lower part of the stem of an annual or perennial, or the lowest branches of a plant, are sometimes underground and assume the appearance of a root. They then take the name of *rhizome*. The rhizome may always be distinguished from the true root by the presence or production of one or more buds, or leaves, or scales.

§ 3. *The Stock.*

22. The **Stock** of a herbaceous perennial, in its most complete state, includes a small portion of the summits of the previous year's roots, as well as of the base of the previous year's stems. Such stocks will increase yearly, so as at length to form dense tufts. They will often preserve through the winter a few leaves, amongst which are placed the buds which grow out into stems the following year, whilst the under side of the stock emits new roots from or amongst the remains of the old ones. These perennial stocks only differ from the permanent base of an undershrub in the shortness of the perennial part of the stems and in their texture usually less woody.

23. In some perennials, however, the stock consists merely of a branch, which proceeds in autumn from the base of the stem either aboveground or underground, and produces one or more buds. This branch, or a portion of it, alone survives the winter. In the following year its buds produce the new stem and roots, whilst the rest of the plant, even the branch on which these buds were formed, has died away. These *annual stocks*, called sometimes *hybernacula*, *offsets*, or *stolons*, keep up the communication between the annual stem and root of one year and those of the following year, thus forming altogether a perennial plant.

24. The stock, whether annual or perennial, is often entirely underground or root-like. This is the *rootstock*, to which some botanists limit the meaning of the term *rhizome*. When the stock is entirely root-like, it is popularly called the *crown* of the root.

25. The term *tuber* is applied to a short, thick, more or less succulent rootstock or rhizome, as well as to a root of that shape (20), although some botanists propose to restrict its meaning to the one or to the other. An Orchis tuber, called by some a *knob*, is an annual tuberous rootstock with one bud at the top. A potato is an annual tuberous rootstock with several buds.

26. A *bulb* is a stock of a shape approaching to globular, usually rather conical above and flattened underneath, in which the bud or buds are concealed, or nearly so, under *scales*. These scales are the more or less thickened bases of the decayed leaves of the preceding year, or of the undeveloped leaves of the future year, or of both. Bulbs are annual or perennial, usually underground or close to the ground, but occasionally buds in the axils of the upper leaves become transformed into bulbs. Bulbs are said to be *scaly* when their scales are thick and loosely imbricated, *tunicated* when the scales are thinner, broader, and closely rolled round each other in concentric layers.

27. A *corm* is a tuberous rootstock, usually annual, shaped like a bulb, but in which the bud or buds are not covered by scales, or of which the scales are very thin and membranous.

§ 4. The Stem.

28. **Stems** are

erect, when they ascend perpendicularly from the root or stock; *twiggy* or *virgate*, when at the same time they are slender, stiff, and scarcely branched.

sarmentose, when the branches of a woody stem are long and weak, although scarcely climbing.

decumbent or *ascending*, when they spread horizontally, or nearly so, at the base, and then turn upwards and become erect.

procumbent, when they spread along the ground the whole or the greater portion of their length; *diffuse*, when at the same time very much and rather loosely branched.

prostrate, when they lie still closer to the ground.

creeping, when they emit roots at their nodes. This term is also frequently applied to any rhizomes or roots which spread horizontally.

tufted or *cæspitose*, when very short, close, and many together from the same stock.

29. Weak climbing stems are said to *twine*, when they support themselves by winding spirally round any object; such stems are also called *volute*. When they simply climb without twining, they support themselves by their leaves, or by special clasping organs called *tendrils* (169), or sometimes, like the Ivy, by small root-like excreescences.

30. *Suckers* are young plants formed at the end of creeping, underground root-stocks. *Scions*, *runners*, and *stolons*, or *stoles*, are names given to young plants formed at the end or at the nodes (31) of branches or stocks creeping wholly or partially above-ground, or sometimes to the creeping stocks themselves.

31. A *node* is a point of the stem or its branches at which one or more leaves, branches, or leaf-buds (16) are given off. An *internode* is the portion of the stem comprised between two nodes.

32. **Branches** or **leaves** are

opposite, when two proceed from the same node on opposite sides of the stem.

whorled or *verticillate* (in a *whorl* or *verticil*), when several proceed from the same node, arranged regularly round the stem; *geminate*, *ternate*, *fascicled*, or *fasciculate*, when two, three, or more proceed from the same node on the same side of the stem. A tuft of fasciculate leaves is usually in fact an axillary leafy branch, so short that the leaves appear to proceed all from the same point.

alternate, when one only proceeds from each node, one on one side and the next above or below on the opposite side of the stem.

decussate, when opposite, but each pair placed at right-angles to the next pair above or below it; *distichous*, when regularly arranged one above another in two opposite rows, one on each side of the stem; *tristichous*, when in three rows, etc. (92).

scattered, when irregularly arranged round the stem; frequently, however, botanists apply the term *alternate* to all branches or leaves that are neither opposite nor whorled.

second, when all start from or are turned to one side of the stem.

33. **Branches** are *dichotomous*, when several times forked, the two branches of each fork being nearly equal; *trichotomous*, when there are three nearly equal branches at each division instead of two; but when the middle branch is evidently the principal one, the stem is usually said to have two opposite branches; *umbellate*, when divided in the same manner into several nearly equal branches proceeding from the same point. If however the central branch is larger than the two or more lateral ones, the stem is said to have opposite or whorled branches, as the case may be.

34. A *culm* is a name sometimes given to the stem of Grasses, Sedges, and some other Monocotyledonous plants.

§ 5. The Leaves.

35. The ordinary or perfect **Leaf** consists of a flat *blade* or *lamina*, usually green, and more or less horizontal, attached to the stem by a stalk called a *footstalk* or *petiole*. When the form or dimensions of a leaf are spoken of, it is generally the blade that is meant, without the petiole or stalk.

36. The end by which a leaf, a part of the flower, a seed, or any other organ, is

attached to the stem or other organ, is called its *base*, the opposite end is its *apex* or summit, excepting sometimes in the case of anther-cells (115).

37. Leaves are

sessile, when the blade rests on the stem without the intervention of a petiole.

amplexical or stem-clasping, when the sessile base of the blade clasps the stem horizontally.

perfoliate, when the base of the blade not only clasps the stem, but closes round it on the opposite side, so that the stem appears to pierce through the blade.

decurrent, when the edges of the leaf are continued down the stem so as to form raised lines or narrow appendages, called *wings*.

sheathing, when the base of the blade, or of the more or less expanded petiole, forms a vertical sheath round the stem for some distance above the node.

38. Leaves and flowers are called *radical*, when inserted on a rhizome or stock, or so close to the base of the stem as to appear to proceed from the root, rhizome, or stock; *cauline*, when inserted on a distinct stem. Radical leaves are *rosulate* when they spread in a circle on the ground.

39. Leaves are

simple and *entire*, when the blade consists of a single piece, with the margin nowhere indented, *simple* being used in opposition to *compound*, *entire* in opposition to *dentate*, *lobed*, or *divided*.

ciliate, when bordered with thick hairs or fine hair-like teeth.

dentate or *toothed*, when the margin is only cut a little way in, into what have been compared to teeth. Such leaves are *serrate*, when the teeth are regular and pointed like the teeth of a saw; *crenate*, when regular and blunt or rounded (compared to the battlements of a tower); *serrulate* and *crenulate*, when the serratures or crenatures are small; *sincate*, when the teeth are broad, not deep, and irregular (compared to bays of the coast); *wavy* or *undulate*, when the edges are not flat, but bent up and down (compared to the waves of the sea).

lobed or *cleft*, when more deeply indented or divided, but so that the incisions do not reach the midrib or petiole. The portions thus divided take the name of *lobes*. When the lobes are narrow and very irregular, the leaves are said to be *lacinate*. The spaces between the teeth or lobes are called *sinuses*.

divided or *dissected*, when the incisions reach the midrib or petiole, but the parts so divided off, called *segments*, do not separate from the petiole, even when the leaf falls, without tearing.

compound, when divided to the midrib or petiole, and the parts so divided off, called *leaflets*, separate, at least at the fall of the leaf, from the petiole, as the whole leaf does from the stem, without tearing. The common stalk upon which the leaflets are inserted is called the *common petiole* or the *rachis*; the separate stalk of each leaflet is a *petiolule*.

40. Leaves are more or less marked by *veins*, which, starting from the stalk, diverge or branch as the blade widens, and spread all over it more or less visibly. The principal ones, when prominent, are often called *ribs* or *nerves*, the smaller branches only then retaining the name of *veins*, or the latter are termed *veinlets*. The smaller veins are often connected together like the meshes of a net, they are then said to be *reticulate* or *net-veined*. When one principal vein runs direct from the stalk towards the summit of the leaf, it is called the *midrib*. When several start from the stalk, diverge slightly without branching, and converge again towards the summit, they are said to be *parallel*, although not mathematically so. When 3 or 5 or more ribs or nerves diverge from the base, the leaf is said to be 3-nerved, 5-nerved, etc., but if the lateral ones diverge from the midrib a little above the base, the leaf is *tripinnerved*, *quintupinnerved*, etc. The arrangement of the veins of a leaf is called their *venation*.

41. The Leaflets, Segments, Lobes, or Veins of leaves are

pinnate (feathered), when there are several succeeding each other on each side of the midrib or petiole, compared to the branches of a feather. A pinnately lobed or divided leaf is called *lyrate* when the terminal lobe or segment is much larger and broader than the lateral ones, compared, by a stretch of imagination, to a lyre; *rac-*

ciliate, when the lateral lobes are curved backwards towards the base of the leaf; *pectinate*, when the lateral lobes are numerous, narrow, and regular, like the teeth of a comb.

palmate or digitate, when several diverge from the same point, compared to the fingers of the hand.

ternate, when three only start from the same point, in which case the distinction between the palmate and pinnate arrangement often ceases, or can only be determined by analogy with allied plants. A leaf with ternate lobes is called *trifoliate*. A leaf with three leaflets is sometimes improperly called a ternate leaf: it is the leaflets that are ternate; the whole leaf is *trifoliate*. Ternate leaves are leaves growing thus together.

pedate, when the division is at first ternate, but the two outer branches are forked, the outer ones of each fork again forked, and so on, and all the branches are near together at the base, compared vaguely to the foot of a bird.

42. Leaves with pinnate, palmate, pedate, etc. leaflets are usually for brevity called *pinnate*, *palmate*, *pedate*, etc., *leaves*. If they are so cut into segments only, they are usually said to be *pinnatisect*, *palmatisect*, *pedatisect*, etc., although the distinction between segments and leaflets is often implied in descriptions, and cannot indeed always be ascertained. If the leaves are so cut only into lobes, they are said to be *pinnatifid*, *palmatifid*, *pedatifid*, etc.

43. The teeth, lobes, segments, or leaflets, may be again toothed, lobed, divided, or compound. Some leaves are even three or more times divided or compound. In the latter case they are termed *decompound*. When two or three pinnate (*bipinnate* or *tripinnate*), each primary or secondary division, with the leaflet it contains, is called a *pinna*. When the pinna of a leaf or the leaflets of a pinna are in pairs, with an odd terminal pinna or leaflet, the leaf or pinna so divided is said to be *odd-pinnate*; if there is an odd terminal pinna or leaflet, the leaf or pinna is *imparipinnate* (*imparipinnate*).

44. The number of leaves or their parts is expressed adjectively by the following numerals, derived from the Latin:—

uni-	bi-	tri-	quadri-	quinque-	sex-	septem-	octo-	novem-	decem-	multi-
1,	2,	3,	4,	5,	6,	7,	8,	9,	10,	many.

preceded to a termination, indicating the particular kind of part referred to. Thus—*unidentate*, *bidentate*, *multidentate*, mean one-toothed, two-toothed, many-toothed, etc.

bifid, *trifid*, *multifid*, mean two-lobed, three-lobed, many-lobed, etc.

unifoliate, *bifoliate*, *multifoliate*, mean having one leaflet, two leaflets, many leaflets, etc.

unifoliate, *bifoliate*, *multifoliate*, mean having one leaf, two leaves, many leaves, etc.

biterminate and *triterminate*, mean twice or thrice ternately divided.

unijugate, *bijugate*, *multijugate*, etc., pinnae or leaflets, mean that they are in one, two, many, etc., pairs (*juga*).

45. **Leaves** or their parts, when **flat**, or any other flat organs in plants, are

linear, when long and narrow, at least four or five times as long as broad, falsely compared to a mathematical line, for a linear leaf has always a perceptible breadth.

laucolate, when about three or more times as long as broad, broadest below the middle, and tapering towards the summit, compared to the head of a lance.

cuneate, when broadest above the middle, and tapering towards the base, compared to a wedge with the point downwards; when very broadly cuneate and rounded at the top, it is often called *obovate* or *oblong*.

spatulate, when the broad part near the top is short, and the narrow tapering part long, compared to a spatula or flat blade.

ovate, when scarcely twice as long as broad, and rather broader below the middle, compared to the longitudinal section of an egg; *obovate* is the same form, with the broadest part above the middle.

orbicular, *ovoid*, *oblong*, *elliptical*, *rhomboidal*, etc., when compared to the corresponding mathematical figures.

transversely oblong, or *oblate*, when conspicuously broader than long.

falcate, when curved like the blade of a scythe.

46. Intermediate forms between any two of the above are expressed by combining two terms. Thus, a *linear-lanceolate* leaf is long and narrow, yet broader below the middle, and tapering to a point; a *linear-oblong* one is scarcely narrow enough to be called linear, yet too narrow to be strictly oblong, and does not conspicuously taper either towards the summit or towards the base.

47. The *apex* or *summit* of a leaf is

acute or *pointed*, when it forms an acute angle or tapers to a point.

obtuse or *blunt*, when it forms a very obtuse angle, or more generally when it is more or less rounded at the top.

acuminate or *cuspidate*, when suddenly narrowed at the top, and then more or less prolonged into an *acumen* or *point*, which may be acute or obtuse, linear or tapering. Some botanists make a slight difference between the *acuminate* and *cuspidate* apex, the *acumen* being more distinct from the rest of the leaf in the latter case than in the former; but in general the two terms are used in the same sense, some preferring the one and some the other.

truncate, when the end is cut off square.

retuse, when very obtuse or truncate, and slightly indented.

emarginate or *notched*, when more decidedly indented at the end of the midrib; *obcordate*, if at the same time approaching the shape of a heart with its point downwards.

macronate, when the midrib is produced beyond the apex in the form of a small point.

aristate, when the point is fine like a hair.

48. The base of the leaf is liable to the same variations of form as the apex, but the terms more commonly used are *tapering* or *narrowed* for acute and acuminate, *rounded* for obtuse, and *cordate* for emarginate. In all cases the petiole or point of attachment prevent any such absolute termination at the base as at the apex.

49. A leaf may be *cordate* at the base whatever be its length or breadth, or whatever the shape of the two lateral lobes, called *auricles* (or *little ears*), formed by the indenture or notch, but the term *cordiform* or *heart-shaped* leaf is restricted to an ovate and acute leaf, *cordate* at the base, with rounded auricles. The word *auricles* is more particularly used as applied to sessile and stem-clasping leaves.

50. If the auricles are pointed, the leaf is more particularly called *auriculate*; it is moreover said to be *sagittate*, when the points are directed downwards, compared to an arrow-head; *hastate*, when the points diverge horizontally, compared to a halbert.

51. A *reniform* leaf is broader than long, slightly but broadly cordate at the base, with rounded auricles, compared to a kidney.

52. In a *peltate* leaf, the stalk, instead of proceeding from the lower edge of the blade, is attached to the under surface, usually near the lower edge, but sometimes in the very centre of the blade. The peltate leaf has usually several principal nerves radiating from the point of attachment, being, in fact, a cordate leaf, with the auricles united.

53. All these modifications of division and form in the leaf pass so gradually one into the other that it is often difficult to say which term is the most applicable - whether the leaf be toothed or lobed, divided or compound, oblong or lanceolate, obtuse or acute, &c. The choice of the most apt expression will depend on the skill of the describer.

54. **Leaves, when solid, Stems, Fruits, Tubers, and other parts of plants, when not flattened like ordinary leaves, are**

setaceous or *capillary*, when very slender like bristles or hairs.

acicular, when very slender, but stiff and pointed like needles.

subulate, when rather thicker and firmer like awls.

linear, when at least four times as long as thick; *oblong*, when from about two to about four times as long as thick, the terms having the same sense as when applied to flat surfaces.

ovoid, when egg-shaped, with the broad end downwards, *obovoid* if the broad end is upwards; these terms corresponding to *ovate* and *obovate* shapes in flat surfaces.

globular or *spherical*, when corresponding to *orbicular* in a flat surface. *Round* applies to both.

turbinate, when shaped like a top.

conical, when tapering upwards; *obconical*, when tapering downwards, if in both cases a transverse section shows a circle.

pyramidal, when tapering upwards; *obpyramidal*, when tapering downwards, if in both cases a transverse section shows a triangle or polygon.

fusiform, or spindle-shaped, when tapering at both ends; *cylindrical*, when not tapering at either end, if in both cases the transverse section shows a circle, or sometimes irrespective of the transverse shape.

terete, when the transverse section is not angular; *trigonus*, *triangular*, if the transverse section shows a triangle, irrespective in both cases of longitudinal form.

compressed, when more or less flattened laterally; *depressed*, when more or less flattened vertically, or at any rate at the top; *obcompressed* (in the achenes of *Compositæ*), when flattened from front to back.

articulate or *jointed*, if at any period of their growth (usually when fully formed and approaching their decay, or in the case of fruits when quite ripe) they separate, without tearing, into two or more pieces placed end to end. The joints where they separate are called *articulations*, each separate piece an *article*. The name of *joint* is, in common language, given both to the articulation and the article, but more especially to the former. Some modern botanists, however, propose to restrict it to the article, giving the name of *joining* to the articulation.

didymous, when slightly two-lobed, with rounded obtuse lobes.

moniliform, or beaded, when much contracted at regular intervals, but not separating spontaneously into articles.

55. In their consistence **Leaves** or other organs are

fleshy, when thick and soft; *succulent* is generally used in the same sense, but implies the presence of more juice.

coriaceous, when firm and stiff, or very tough, of the consistence of leather.

crustaceous, when firm and brittle.

membranous, when thin and not stiff.

scarious or *scariose*, when very thin, more or less transparent and not green, yet rather stiff.

56. The terms applied botanically to the consistence of solids are those in general use in common language.

57. The mode in which unexpanded leaves are disposed in the leaf-bud is called their *vernation* or *præfoliation*; it varies considerably, and technical terms have been proposed to express some of its varieties, but it has been hitherto rarely noticed in descriptive botany.

§ 6. Scales, Bracts, and Stipules.

58. **Scales** (*Squamæ*) are leaves very much reduced in size, usually sessile, seldom green or capable of performing the respiratory functions of leaves. In other words, they are organs resembling leaves in their position on the plant, but differing in size, colour, texture, and functions. They are most frequent on the stock of perennial plants, or at the base of annual branches, especially on the buds of future shoots, when they serve apparently to protect the dormant living germ from the rigour of winter. In the latter case they are usually short, broad, close together, and more or less *imbricated*, that is, overlapping each other like the tiles of a roof. It is this arrangement as well as their usual shape that has suggested the name of *scales*, borrowed from the scales of a fish. Imbricated scales, bracts, or leaves, are said to be *squarrose*, when their tips are pointed and very spreading or recurved.

59. Sometimes, however, most or all the leaves of the plant are reduced to small scales, in which case they do not appear to perform any particular function. The name of *scales* is also given to any small broad scale-like appendages or reduced organs, whether in the flower or any other part of the plant.

60. **Bracts** (*Bractæ*) are the upper leaves of a plant in flower (either all those of the flowering branches, or only one or two immediately under the flower), when differ-

ent from the stem-leaves in size, shape, colour, or arrangement. They are generally much smaller and more sessile. They often partake of the colour of the flower, although they very frequently also retain the green colour of the leaves. When small they are often called *scales*.

61. *Floral leaves* or *leafy bracts* are generally the lower bracts on the upper leaves at the base of the flowering branches, intermediate in size, shape, or arrangement, between the stem-leaves and the upper bracts.

62. *Bracteoles* are the one or two last bracts under each flower, when they differ materially in size, shape, or arrangement from the other bracts.

63. *Stipules* are leaf-like or scale-like appendages at the base of the leaf-stalk, or on the node of the stem. When present there are generally two, one on each side of the leaf, and they sometimes appear to protect the young leaf before it is developed. They are however exceedingly variable in size and appearance, sometimes exactly like the true leaves except that they have no buds in their axils, or looking like the leaflets of a compound leaf, sometimes apparently the only leaves of the plant; generally small and narrow, sometimes reduced to minute scales, spots or scars, sometimes united into one opposite the leaf, or more or less united with, or *adnate* to the petiole, or quite detached from the leaf, and forming a ring or sheath round the stem in the axil of the leaf. In a great number of plants they are entirely wanting.

64. *Stipella*, or secondary stipules, are similar organs, sometimes found on compound leaves at the points where the leaflets are inserted.

65. When scales, bracts, or stipules, or almost any part of the plant besides leaves and flowers are stalked, they are said to be *stipitate*, from *stipes*, a stalk.

§ 7. Inflorescence and its Bracts.

66. The **Inflorescence** of a plant is the arrangement of the flowering branches, and of the flowers upon them. An *Inflorescence* is a flowering branch, or the flowering summit of a plant above the last stem-leaves, with its branches, bracts, and flowers.

67. A single flower, or an inflorescence, is *terminal* when at the summit of a stem or leafy branch, *axillary* when in the axil of a stem-leaf, *leaf-opposed* when opposite to a stem-leaf. The inflorescence of a plant is said to be *terminal* or *determinate* when the main stem and principal branches end in a flower or inflorescence (not in a leaf-bud), *axillary* or *indeterminate* when all the flowers or inflorescences are axillary, the stem or branches ending in leaf-buds.

68. A *Peduncle* is the stalk of a solitary flower, or of an inflorescence; that is to say, the portion of the flowering branch from the last stem-leaf to the flower, or to the first ramification of the inflorescence, or even up to its last ramifications; but the portion extending from the first to the last ramifications or the axis of inflorescence is often distinguished under the name of *rachis*.

69. A *Scape* or *radical Peduncle* is a leafless peduncle proceeding from the stock, or from near the base of the stem, or apparently from the root itself.

70. A *Pedicel* is the last branch of an inflorescence, supporting a single flower.

71. The branches of inflorescences may be, like those of stems, opposite, alternate, etc. (32, 33), but very often their arrangement is different from that of the leafy branches of the same plant.

72. **Inflorescence** is

centrifugal, when the terminal flower opens first, and those on the lateral branches are successively developed.

centripetal, when the lowest flowers open first, and the main stem continues to elongate, developing fresh flowers.

73. Determinate inflorescence is usually centrifugal. Indeterminate inflorescence is always centripetal. Both inflorescences may be combined on one plant, for it often happens that the main branches of an inflorescence are centripetal, whilst the flowers on the lateral branches are centrifugal; or *vice versâ*.

74. An **Inflorescence** is

a *Spike*, or *spicate*, when the flowers are sessile along a simple undivided axis or rachis.

a *Raceme*, or *racemose*, when the flowers are borne on pedicels along a single undivided axis or rachis.

a *Panicle*, or *paniculate*, when the axis is divided into branches bearing two or more flowers.

a *Head*, or *capitate*, when several sessile or nearly sessile flowers are collected into a compact head-like cluster. The short, flat, convex or conical axis on which the flowers are seated, is called the *receptacle*, a term also used for the torus of a single flower (135). The very compact flower-heads of *Compositæ* are often termed *compound flowers*.

an *Umbel*, or *umbellate*, when several branches or pedicels appear to start from the same point and are nearly of the same length. It differs from the head, like the raceme from the spike, in that the flowers are not sessile. An umbel is said to be *simple*, when each of its branches or rays bears a single flower; *compound*, when each ray bears a *partial umbel* or *umbellule*.

a *Corymb*, or *corymbose*, when the branches and pedicels, although starting from different points, all attain the same level, the lower ones being much longer than the upper. It is a flat-topped or *fastigiate* panicle.

a *Cyme*, or *cymose*, when branched and centrifugal. It is a centrifugal panicle, and is often corymbose. The central flower opens first. The lateral branches successively developed are usually forked or opposite (dichotomous or trichotomous), but sometimes after the first forking the branches are no longer divided, but produce a succession of pedicels on their upper side forming apparently unilateral centripetal racemes; whereas if attentively examined, it will be found that each pedicel is at first terminal, but becomes lateral by the development of one outer branch only, immediately under the pedicel. Such branches, when in bud, are generally rolled back at the top, like the tail of a scorpion, and are thence called *scorpioid*.

a *Thyrus*, or *thyrsoid*, when cymes, usually opposite, are arranged in a narrow pyramidal panicle.

75. There are numerous cases where inflorescences are intermediate between some two of the above, and are called by different botanists by one or the other name, according as they are guided by apparent or by theoretical similarity. A spike-like panicle, where the axis is divided into very short branches forming a cylindrical compact inflorescence, is called sometimes a spike, sometimes a panicle. If the flowers are in distinct clusters along a simple axis, the inflorescence is described as an *interrupted* spike or raceme, according as the flowers are nearly sessile or distinctly pedicellate; although when closely examined the flowers will be found to be inserted not on the main axis, but on a very short branch, thus, strictly speaking, constituting a panicle.

76. The *catkins* (*amenta*) of *Amentaceæ*, the *spadices* of several *Monocotyledons*, the *ears* and *spikelets* of *Grasses* are forms of the spike.

77. **Bracts** are generally placed singly under each branch of the inflorescence, and under each pedicel; bracteoles are usually two, one on each side, on the pedicel or close under the flower, or even upon the calyx itself; but bracts are also frequently scattered along the branches without axillary pedicels; and when the differences between the bracts and bracteoles are trifling or immaterial, they are usually all called bracts.

78. When three bracts appear to proceed from the same point, they will, on examination, be found to be really either one bract and two stipules, or one bract with two bracteoles in its axil. When two bracts appear to proceed from the same point, they will usually be found to be the stipules of an undeveloped bract, unless the branches of the inflorescence are opposite, when the bracts will of course be opposite also.

79. When several bracts are collected in a whorl, or are so close together as to appear whorled, or are closely imbricated round the base of a head or umbel, they are collectively called an *Involucre*. The bracts composing an involucre are described under the names of *leaves*, *leaflets*, *bracts*, or *scales*, according to their appearance. *Phyllaries* is a useless term, lately introduced for the bracts or scales of the involucre of *Compositæ*. An *Involucrel* is the involucre of a partial umbel.

80. When several very small bracts are placed round the base of a calyx or of an

involucre, they have been termed a *calycle*, and the calyx or involucre said to be *calyculate*, but these terms are now falling into disuse, as conveying a false impression.

81. A *Spatha* is a bract or floral leaf enclosing the inflorescence of some Monocotyledons.

82. *Palea*, *Pales*, or *Chaff*, are the inner bracts or scales in *Compositæ*, *Graminæ* and some other plants, when of a thin yet stiff consistence, usually narrow and of a pale colour.

83. *Glumes* are the bracts enclosing the flowers of *Cyperacæ* and *Graminææ*.

§ 8. The Flower in General.

84. A *complete Flower* (15) is one in which the calyx, corolla, stamens, and pistils are all present; a *perfect flower*, one in which all these organs, or such of them as are present, are capable of performing their several functions. Therefore, properly speaking, an *incomplete flower* is one in which any one or more of these organs is wanting; and an *imperfect flower*, one in which any one or more of these organs is so altered as to be incapable of properly performing its functions. These imperfect organs are said to be *abortive* if much reduced in size or efficiency, *rudimentary* if so much so as to be scarcely perceptible. But, in many works, the term *incomplete* is specially applied to those flowers in which the perianth is simple or wanting, and *imperfect* to those in which either the stamens or pistil are imperfect or wanting.

85. A *Flower* is

dichlamydeous, when the perianth is double, both calyx and corolla being present and distinct.

monochlamydeous, when the perianth is single, whether by the union of the calyx and corolla, or the deficiency of either.

asepalous, when there is no calyx.

apetalous, when there is no corolla.

naked, when there is no perianth at all.

hermaphrodite or *bisexual*, when both stamens and pistil are present and perfect.

male or *staminate*, when there are one or more stamens, but either no pistil at all or an imperfect one.

female or *pistillate*, when there is a pistil, but either no stamens at all, or only imperfect ones.

neuter, when both stamens and pistil are imperfect or wanting.

barren or *sterile*, when from any cause it produces no seed.

fertile, when it does produce seed. In some works the terms *barren*, *fertile*, and *perfect* are also used respectively as synonyms of *male*, *female*, and *hermaphrodite*.

86. The flowers of a plant or species are said collectively to be *unisexual* or *diclinous* when the flowers are all either male or female.

monœcious, when the male and female flowers are distinct, but on the same plant.

diœcious, when the male and female flowers are on distinct plants.

polygamous, when there are male, female, and hermaphrodite flowers on the same or on distinct plants.

87. A *head* of flowers is *heterogamous* when male, female, hermaphrodite, and neuter flowers, or any two or three of them, are included in one head; *homogamous*, when all the flowers included in one head are alike in this respect. A *spike* or *head* of flowers is *androgamous* when male and female flowers are mixed in it. These terms are only used in the case of very few Natural Orders.

88. As the scales of buds are leaves undeveloped or reduced in size and altered in shape and consistence, and bracts are leaves likewise reduced in size, and occasionally altered in colour; so the parts of the flower are considered as leaves still further altered in shape, colour, and arrangement round the axis, and often more or less combined with each other. The details of this theory constitute the comparatively modern branch of botany called *Vegetable Metamorphosis*, or *Homology*, sometimes improperly termed *Morphology* (8).

89. To understand the arrangement of the floral parts, let us take a *complete flower*, in which moreover all the parts are *free* from each other, *definite* in number, *i. e.* always the same in the same species, and *symmetrical* or *isomerous*, *i. e.* when each whorl consists of the same number of parts.

40. Such a complete symmetrical flower consists usually of either four or five whorls of altered leaves (SS), placed immediately one within the other.

The **Calyx** forms the outer whorl. Its parts are called *sepals*.

The **Corolla** forms the next whorl. Its parts, called *petals*, usually *alternate* with the sepals; that is to say, the centre of each petal is immediately over or within the interval between two sepals.

The **Stamens** form one or two whorls within the petals. If two, those of the outer whorl (the *outer stamens*) alternate with the petals, and are consequently opposite to, or over the centre of the sepals; those of the inner whorl (the *inner stamens*) alternate with the outer ones, and are therefore opposite to the petals. If there is only one whorl of stamens, they most frequently alternate with the petals; but sometimes they are opposite the petals and alternate with the sepals.

The **Pistil** forms the inner whorl; its carpels usually alternate with the inner row of stamens.

41. In an axillary or lateral flower the *upper* parts of each whorl (sepals, petals, stamens, or carpels) are those which are next to the main axis of the stems or branch, the *lower* parts those which are furthest from it; the intermediate ones are said to be *lateral*. The words *anterior* (front) and *posterior* (back) are often used for lower and upper respectively, but their meaning is sometimes reversed if the writer supposes himself in the centre of the flower instead of outside of it.

42. The number of parts in each whorl of a flower is expressed adjectively by the following numerals derived from the Greek:—

mono-	di-	tri-	tetra-	penta-	hexa-	hepta-	octo-	ennea-	deca-	etc.,	poly-
1-	2-	3-	4-	5-	6-	7-	8-	9-	10-		many

prefixed to a termination indicating the whorl referred to.

43. Thus, a **Flower** is *disepalous*, *trisepalous*, *tetrasepalous*, *polyssepalous*, etc., according as there are 2, 3, 4, or many (or an indefinite number of) sepals.

diptalous, *tripetalous*, *polypetalous*, etc., according as there are 2, 3, or many petals.

diandrous, *triandrous*, *polyandrous*, etc., according as there are 2, 3, or many stamens.

digynous, *trigynous*, *polygynous*, etc., according as there are 2, 3, or many carpels.

And generally (if symmetrical), *dicarous*, *tricarous*, *polycarous*, etc., according as there are 2, 3, or many (or an indefinite number of) parts to each whorl.

44. Flowers are *unsymmetrical* or *anisomerous*, strictly speaking, when any one of the whorls has a different number of parts from any other; but when the pistils alone are reduced in number, the flower is still frequently called symmetrical or isomerous, if the calyx, corolla, and staminal whorls have all the same number of parts.

45. Flowers are *irregular* when the parts of any one of the whorls are unequal in size, dissimilar in shape, or do not spread roundly round the axis at equal distances. It is however more especially irregularity of the corolla that is referred to in descriptions. A slight inequality in size or direction in the other whorls does not prevent the flower being classed as *regular*, if the corolla or perianth is conspicuous and regular.

§ 9. The Calyx and Corolla, or Perianth.

46. The **Calyx** (40) is usually green, and smaller than the corolla; sometimes very minute, rudimentary, or wanting, sometimes very indistinctly whorled, or not whorled at all, or in two whorls, or composed of a large number of sepals, of which the outer ones pass gradually into bracts, and the inner ones into petals.

47. The **Corolla** (40) is usually coloured, and of a more delicate texture than the calyx, and, in popular language, is often more specially meant by the *flower*. Its petals are more rarely in two whorls, or indefinite in number, and the whorl more rarely broken than in the case of the calyx, at least when the plant is in a natural state. *Double flowers* are in most cases an accidental deformity or monster in which the ordinary number of petals is multiplied by the conversion of stamens, sepals, or even carpels into petals, by the division of ordinary petals, or simply by the addition of supernumerary ones. Petals are also sometimes very small, rudimentary, or entirely deficient.

98. In very many cases, a so-called *simple perianth* (15) (of which the parts are usually called *leaves* or *segments*) is one in which the sepals and petals are similar in form and texture, and present apparently a single whorl. But if examined in the young bud one half of the parts will generally be found to be placed outside the other half, and there will frequently be some slight difference in texture, size, and colour, indicating to the close observer the presence of both calyx and corolla. Hence much discrepancy in descriptive works. Where one botanist describes a simple perianth of six segments, another will speak of a double perianth of three sepals and three petals.

99. The following terms and prefixes, expressive of the modifications of form and arrangement of the corolla and its petals, are equally applicable to the calyx and its sepals, and to the simple perianth and its segments.

100. The Corolla is said to be *monopetalous* when the petals are united, either entirely or at the base only, into a cup, tube, or ring; *polypetalous* when they are all free from the base. These expressions, established by a long usage, are not strictly correct, for *monopetalous* (consisting of a single petal) should apply rather to a corolla really reduced to a single petal, which would then be on one side of the axis; and *polypetalous* is sometimes used more appropriately for a corolla with an indefinite number of petals. Some modern botanists have therefore proposed the term *gamopetalous* for the corolla with united petals, and *dialypetalous* for that with free petals; but the old-established expressions are still the most generally used.

101. When the petals are partially united, the lower entire portion of the corolla is called the *tube*, whatever be its shape, and the free portions of the petals are called the *teeth*, *lobes*, or *segments* (39), according as they are short or long in proportion to the whole length of the corolla. When the tube is excessively short, the petals appear at first sight free, but their slight union at the base must be carefully attended to, being of importance in classification.

102. The *Æstivation* of a corolla, is the arrangement of the petals, or of such portion of them as is free, in the unexpanded bud. It is

valvate, when they are strictly whorled in their whole length, their edges being placed against each other without overlapping. If the edges are much inflexed, the æstivation is at the same time *induplicate*; *involute*, if the margins are rolled inward; *reduplicate*, if the margins project outwards into salient angles; *revolute*, if the margins are rolled outwards; *pliate*, if the petals are folded in longitudinal plaits.

imbricate, when the whorl is more or less broken by some of the petals being outside the others, or by their overlapping each other at least at the top. Five-petaled imbricate corollas are *quinqueciously* imbricate when one petal is outside, and an adjoining one wholly inside, the three others intermediate and overlapping on one side; *bilabiate*, when two adjoining ones are inside or outside the three others. Imbricate petals are described as *crumpled* (*corrugate*) when puckered irregularly in the bud.

twisted, *contorted*, or *convolute*, when each petal overlaps an adjoining one on one side, and is overlapped by the other adjoining one on the other side. Some botanists include the twisted æstivation in the general term *imbricate*; others carefully distinguish the one from the other.

103. In a few cases the overlapping is so slight that the three æstivations cannot easily be distinguished one from the other; in a few others the æstivation is variable even in the same species, but, in general, it supplies a constant character in species, in genera, or even in Natural Orders.

104. In general shape the **Corolla** is

tubular, when the whole or the greater part of it is in the form of a tube or cylinder.

campanulate, when approaching in some measure the shape of a cup or bell.

urceolate, when the tube is swollen or nearly globular, contracted at the top, and slightly expanded again in a narrow rim.

rotate or *stiltate*, when the petals or lobes are spread out horizontally from the base, or nearly so, like a wheel or star.

hypanthiiform or *salver-shaped*, when the lower part is cylindrical and the upper portion expanded horizontally. In this case the name of *tube* is restricted to the cylindrical part, and the horizontal portion is called the *limb*, whether it be divided to the base or not. The orifice of the tube is called its *mouth* or *throat*.

infundibuliform or *funnel-shaped*, when the tube is cylindrical at the base, but enlarged at the top into a more or less campanulate limb, of which the lobes often spread horizontally. In this case the campanulate part, up to the commencement of the lobes, is sometimes considered as a portion of the tube, sometimes as a portion of the limb, and by some botanists again described as independent of either, under the name of *throat* (*faucis*). Generally speaking, however, in campanulate, infundibuliform, or other corollas, where the lower entire part passes gradually into the upper divided and more spreading part, the distinction between the *tube* and the *limb* is drawn either at the point where the lobes separate, or at the part where the corolla first expands, according to which is the most marked.

105. Irregular corollas have received various names according to the more familiar forms they have been compared to. Some of the most important are the

bilabiate or *two-lipped* corolla, when, in a four- or five-lobed corolla, the two or three upper lobes stand obviously apart, like an *upper lip*, from the two or three lower ones or *under lip*. In *Orchitaceæ* and some other families the name of lip, or *labellum*, is given to one of the divisions or lobes of the perianth.

personate, when two-lipped, and the orifice of the tube closed by a projection from the base of the upper or lower lip, called a *palate*.

ringent, when very strongly two-lipped, and the orifice of the tube very open.

spurred, when the tube or the lower part of the petal has a conical hollow projection, compared to the spur of a cock; *saccate*, when the spur is short and round like a little bag; *gibbous*, when projecting at any part into a slight swelling; *foveolate*, when marked in any part with a slight glandular or thickened cavity.

resupinate or *reversed*, when a lip, spur, etc., which in allied species is usually lowest, lies uppermost, and *vice versâ*.

106. The above terms are mostly applied to the forms of monopetalous corollas, but several are also applicable to those of polypetalous ones. Terms descriptive of the special forms of corolla in certain Natural Orders, will be explained under those Orders respectively.

107. Most of the terms used for describing the forms of leaves (39, 45) are also applicable to those of individual petals; but the flat expanded portion of a petal corresponding to the blade of the leaf, is called its *lamina*, and the stalk, corresponding to the petiole, its *claw* (*unguis*). The stalked petal is said to be *pedicellate*.

§ 10. The Stamens.

108. Although in a few cases the outer stamens may gradually pass into petals, yet, in general, **Stamens** are very different in shape and aspect from leaves, sepals, or petals. It is only in a theoretical point of view (not the less important in the study of the physiological economy of the plant) that they can be called altered leaves.

109. This usual form is a stalk, called the *filament*, bearing at the top an *anther* divided into two pouches or *cells*. These anther-cells are filled with *pollen*, consisting of minute grains, usually forming a yellow dust, which, when the flower expands, is scattered from an opening in each cell. When the two cells are not closely contiguous, the portion of the anther that unites them is called the *connective*.

110. The filament is often wanting, and the anther sessile, yet still the stamen is perfect; but if the anther, which is the essential part of the stamen, is wanting, or does not contain pollen, the stamen is imperfect, and is then said to be *barren* or *sterile* (with or without pollen), *abortive*, or *rudimentary* (84), according to the degree to which the impregnation is carried. Imperfect stamens are often called *staminodia*.

111. In unsymmetrical flowers, the stamens of each whorl are sometimes reduced in number below that of the petals, even to a single one; and in several Natural Orders they are multiplied indefinitely.

112. The terms *monandrous* and *polyandrous* are restricted to flowers which have really but one stamen, or an indefinite number respectively. Where several stamens are united into one, the flower is said to be *synandrous*.

113. **Stamens** are

monadelphous, when united by their filaments into one cluster. This cluster either

forms a tube round the pistil, or, if the pistil is wanting, occupies the centre of the flower.

diadelphous, when so united into two clusters. The term is more especially applied to certain *Leguminosæ*, in which nine stamens are united in a tube slit open on the upper side, and a tenth, placed in the slit, is free. In some other plants the stamens are equally distributed in the two clusters.

triadelphous, *pentadelphous*, *polyadelphous*, when so united into three, five, or many clusters.

syngonesious, when united by their anthers in a ring round the pistil, the filaments usually remaining free.

didynamous, when (usually in a bilabiate flower) there are four stamens in two pairs, those of one pair longer than those of the other.

tetradynamous, when (in *Crucifera*) there are six, four of them longer than the two others.

exserted, when longer than the corolla, or even when longer than its tube, if the limb be very spreading.

114. An **Anther** (109) is

adnate, when continuous with the filament, the anther-cells appearing to lie throughout whole length along the upper part of the filament.

innate, when firmly attached by their base to the filament. This is like an adnate anther, but rather more distinct from the filament.

versatile, when attached by their back to the very point of the filament, so as to swing loosely.

115. Anther-cells may be *parallel* or *diverging* at a less or greater angle; or *divericate*, when placed end to end so as to form one straight line. The end of each anther-cell placed nearest to the other cell is generally called its *apex* or *summit*, and the other end its *base* (36); but some botanists reverse the sense of these terms.

116. Anthers have often, on their connectivum or cells, appendages termed *bristles* (*setæ*), *spurs*, *crests*, *points*, *glands*, etc., according to their appearance.

117. Anthers have occasionally only one cell: this may take place either by the disappearance of the partition between two closely contiguous cells, when these cells are said to be *confluent*; or by the abortion or total deficiency of one of the cells, when the anther is said to be *dimidiate*.

118. Anthers will open or *dehiscere* to let out the pollen, like capsules, in *valves*, *pores* or *slits*. Their dehiscence is *introrse*, when the opening faces the pistil; *extrorse*, when towards the circumference of the flower.

119. Pollen (109) is not always in the form of dust. It is sometimes collected in each cell into one or two little wax-like masses. Special terms used in describing these masses or other modifications of the pollen will be explained under the Orders when they occur.

§ 11. The Pistil.

120. The carpels (91) of the **Pistil**, although they may occasionally assume, rather more than stamens, the appearance and colour of leaves, are still more different in shape and structure. They are usually sessile; if stalked, their stalk is called a *pedicel* or *carp.* This stalk, upon which each separate carpel is supported above the receptacle, must not be confounded with the *gynobasis* (143), upon which the whole pistil is sometimes raised.

121. Each carpel consists of three parts:

1. The **Ovary**, or enlarged base, which includes one or more cavities or *cells*, containing one or more small bodies called *ovules*. These are the earliest condition of the future seeds.

2. the **Style**, proceeding from the summit of the ovary, and supporting —

3. the **Stigma**, which is sometimes a point (or *punctiform* stigma) or small head (a *capitate* stigma) at the top of the style or ovary, sometimes a portion of its surface more or less lateral and variously shaped, distinguished by a looser texture, and covered with minute protuberances called *papillæ*.

122. The style is often wanting, and the stigma is then sessile on the ovary, but in

the perfect pistil there is always at least one ovule in the ovary, and some portion of stigmatic surface. Without these the pistil is imperfect, and said to be *barren* (not setting seed), *abortive*, or *rudimentary* (sl), according to the degree of imperfection.

123. The ovary being the essential part of the pistil, most of the terms relating to the number, arrangement, etc., of the carpels, apply specially to their ovaries. In some works each separate carpel is called a pistil, all those of a flower constituting together the *gynacium*; but this term is in little use, and the word *pistil* is more generally applied in a collective sense. When the ovaries are at all united, they are commonly termed collectively a **compound ovary**.

124. The number of carpels or ovaries in a flower is frequently reduced below that of the parts of the other floral whorls, even in flowers otherwise symmetrical. In a very few genera, however, the ovaries are more numerous than the petals, or indefinite. They are in that case either arranged in a single whorl, or form a head or spike in the centre of the flower.

125. The terms *monogynous*, *digynous*, *polygynous*, etc. (with a pistil of one, two, or more parts), are vaguely used, applying sometimes to the whole pistil, sometimes to the ovaries alone, or to the styles or stigmas only. Where a more precise nomenclature is adopted, the flower is

monocarpellary, when the pistil consists of a single simple carpel.

bi-, tri-, etc., to *poly-carpellary*, when the pistil consists of two, three, or an indefinite number of carpels, whether separate or united.

syncarpous, when the carpels or their ovaries are more or less united into one compound ovary.

apocarpous, when the carpels or ovaries are all free and distinct.

126. A **compound ovary** is

unilocular or *one-celled*, when there are no partitions between the ovules, or when these partitions do not meet in the centre so as to divide the cavity into several cells.

plurilocular or *several-celled*, when completely divided into two or more cells by partitions called *dissepiments* (*septa*), usually vertical and radiating from the centre or axis of the ovary to its circumference.

bi-, tri-, etc., to *multi-locular*, according to the number of these cells, two, three, etc., or many.

127. In general the number of cells or of dissepiments, complete or partial, or of rows of ovules, corresponds with that of the carpels, of which the pistil is composed. But sometimes each carpel is divided completely or partially into two cells, or has two rows of ovules, so that the number of carpels appears double what it really is. Sometimes again the carpels are so completely combined and reduced as to form a single cell, with a single ovule, although it really consist of several carpels. But in these cases the ovary is usually described as it appears, as well as such as it is theoretically supposed to be.

128. In apocarpous pistils the styles are usually free, each bearing its own stigma. Very rarely the greater part of the styles, or the stigmas alone, are united, whilst the ovaries remain distinct.

129. **Syncarpous flowers** are said to have

several styles, when the styles are free from the base.

one style, with several branches, when the styles are connected at the base, but separate below the point where the stigmas or stigmatic surfaces commence.

one simple style, with several stigmas, when united up to the point where the stigmas or stigmatic surfaces commence, and then separating.

one simple style, with a branched, lobed, toothed, notched, or entire stigma (as the case may be), when the stigmas also are more or less united. In many works, however, this precise nomenclature is not strictly adhered to, and considerable confusion is often the result.

130. In general the number of styles, or branches of the style or stigma, is the same as that of the carpels, but sometimes that number is doubled, especially in the stigmas, and sometimes the stigmas are dichotomously or pinnately branched, or *penicillate*, that is, divided into a tuft of hair-like branches. All these variations sometimes make it a difficult task to determine the number of carpels forming a compound ovary, but the point is of considerable importance in fixing the affinities of plants, and, by careful

consideration, the *receptacle* as well as the apparent number has now in most cases been agreed upon.

131. The *Placenta* is the part of the inside of the ovary to which the ovules are attached, sometimes a mere point or line on the inner surface, often more or less thickened, or raised. *Placentation* is therefore the indication of the part of the ovary to which the ovules are attached.

132. *Placentas* are

axile, when the ovules are attached to the axis or centre, that is, in plurilocular ovaries, when they are attached to the inner angle of each cell; in unilocular simple ovaries, which have almost always an excentric style or stigma, when the ovules are attached to the side of the ovary nearest to the style; in unilocular compound ovaries, when the ovules are attached to a central protuberance, column, or axis rising up from the base of the cavity. If this column does not reach the top of the cavity, the placenta is said to be *free* and *central*.

parietal, when the ovules are attached to the inner surface of the cavity of a one-celled compound ovary. Parietal placentas are usually slightly thickened or raised lines, sometimes broad surfaces nearly covering the inner surface of the cavity, sometimes projecting far into the cavity, and constituting partial dissepiments, or even meeting in the centre, but without cohering there. In the latter case the distinction between the one-celled and the several celled ovary sometimes almost disappears.

133. Each *Ovule* (121), when fully formed, usually consists of a central mass or *nucleus* enclosed in two bag-like *coats*, the outer one called *primine*, the inner one *secondine*. The *chalaza* is the point of the ovule at which the base of the nucleus is confluent with the coats. The *foramen* is a minute aperture in the coats over the apex of the nucleus.

134. *Ovules* are

orthotropous or *straight*, when the chalaza coincides with the base (36) of the ovule, and the foramen is at the opposite extremity, the axis of the ovule being straight; *campylotropous* or *incurved*, when the chalaza still coinciding with the base of the ovule, the axis of the ovule is curved, bringing the foramen down more or less towards that base.

anatropous or *inverted*, when the chalaza is at the apex of the ovule, and the foramen next to its base, the axis remaining straight. In this, one of the most frequent forms of the ovule, the chalaza is connected with the base by a cord, called the *raphis*, adhering to one side of the ovule, and becoming more or less incorporated with its coats, as the ovule enlarges into a seed.

amphitropous or *half-inverted*, when the ovule being as it were attached laterally, the chalaza and foramen at opposite ends of its straight or curved axis are about equally distant from the base or point of attachment.

§ 12. The Receptacle and Relative Attachment of the Floral Whorls.

135. The *Receptacle* or *torus* is the extremity of the peduncle (above the calyx) upon which the corolla, stamens, and ovary are inserted. It is sometimes little more than a mere point or minute hemisphere, but it is often also more or less elongated, thickened, or otherwise enlarged. It must not be confounded with the receptacle of inflorescence (74).

136. A *Disk*, or *disc*, is a circular enlargement of the receptacle, usually in the form of a cup (*cupular*), of a flat disk or quoin, or of a cushion (*pulvinate*). It is either immediately at the base of the ovary within the stamens, or between the petals and stamens, or bears the petals or stamens or both on its margin, or is quite at the extremity of the receptacle, with the ovaries arranged in a ring round it or under it.

137. The disk may be *entire*, or *toothed*, or *lobed*, or *divided* into a number of parts, usually equal to or twice that of the stamens or carpels. When the parts of the disk are quite separate and short, they are often called *glands*.

138. *Nectaries*, are either the disk, or small deformed petals, or abortive stamens or appendages at the base of petals or stamens, or any small bodies within the flower which do not look like petals, stamens, or ovaries. They were formerly supposed to

supply bees with their honey, and the term is frequently to be met with in the older Floras, but is now deservedly going out of use.

139. When the disk bears the petals and stamens, it is frequently adherent to, and apparently forms part of, the tube of the calyx, or it is adherent to, and apparently forms part of, the ovary, or of both calyx-tube and ovary. Hence the three following important distinctions in the relative insertion of the floral whorls.

140. Petals, or as it is frequently expressed, flowers, are

hypogynous (i. e. under the ovary), when they or the disk that bears them are entirely free both from the calyx and ovary. The ovary is then described as *free* or *superior*, the calyx as *free* or *inferior*, the petals as being *inserted on the receptacle*.

perigynous (i. e. round the ovary), when the disk bearing the petals is quite free from the ovary, but is more or less combined with the base of the calyx-tube. The ovary is then still described as *free* or *superior*, even though the combined disk and calyx-tube may form a deep cup with the ovary lying in the bottom: the calyx is said to be *free* or *inferior*, and the petals are described as *inserted on the calyx*.

epigynous (i. e. upon the ovary), when the disk bearing the petals is combined both with the base of the calyx-tube and the base outside of the ovary: either closing over the ovary so as only to leave a passage for the style, or leaving more or less of the top of the ovary free, but always adhering to it above the level of the insertion of the lowest ovule (except in a very few cases where the ovules are absolutely suspended from the top of the cell). In epigynous flowers the ovary is described as *adherent* or *inferior*, the calyx as *adherent* or *superior*, the petals as *inserted on or above the ovary*. In some works, however, most epigynous flowers are included in the perigynous ones, and a very different meaning is given to the term *epigynous* (144), and there are a few cases where no positive distinction can be drawn between the epigynous and perigynous flowers, or again between the perigynous and hypogynous flowers.

141. When there are no petals, it is the insertion of the stamens that determines the difference between the hypogynous, perigynous, and epigynous flowers.

142. When there are both petals and stamens,

in hypogynous flowers, the petals and stamens are usually free from each other, but sometimes they are combined at the base. In that case, if the petals are distinct from each other, and the stamens are monadelphous, the petals are often said to be *inserted on or combined with the staminal tube*; if the corolla is gamopetalous and the stamens distinct from each other, the latter are said to be *inserted in the tube of the corolla*.

in perigynous flowers, the stamens are usually inserted immediately within the petals, or alternating with them on the edge of the disk, but occasionally much lower down within the disk, or even on the unenlarged part of the receptacle.

in epigynous flowers, when the petals are distinct, the stamens are usually inserted as in perigynous flowers; when the corolla is gamopetalous, the stamens are either free and hypogynous, or combined at the base with (inserted in) the tube of the corolla.

143. When the receptacle is distinctly elongated below the ovary, it is often called a *gynobasis*, *gynophore*, or *stalk of the ovary*. If the elongation takes place below the stamens or below the petals, these stamens or petals are then said to be *inserted on the stalk of the ovary*, and are occasionally, but falsely, described as *epigynous*. Really epigynous stamens (i. e. when the filaments are combined with the ovary) are very rare, unless the rest of the flower is epigynous.

144. An *epigynous disk* is a name given either to the thickened summit of the ovary in epigynous flowers, or very rarely to a real disk or enlargement of the receptacle closing over the ovary.

145. In the relative position of any two or more parts of the flower, whether in the same or in different whorls, they are

connivent, when nearer together at the summit than at the base,

divergent, when further apart at the summit than at the base.

coherent, when united together, but so slightly that they can be separated with little or no laceration; and one of the two cohering parts (usually the smallest or least important) is said to be *adherent* to the other. Grammatically speaking, these two terms convey nearly the same meaning, but require a different form of phrase; prac-

tially however it has been found more convenient to restrict *cohesion* to the union of parts of the same whorl, and *adhesion* to the union of parts of different whorls.

connate, when so closely united that they cannot be separated without laceration. Each of the two connate parts, and especially that one which is considered the smaller or of the least importance, is said to be *adnate* to the other.

free, when neither coherent nor connate.

distinct is also used in the same sense, but is also applied to parts distinctly visible or distinctly limited.

§ 13. The Fruit.

146. The **Fruit** (15) consists of the ovary and whatever other parts of the flower are *persistent* (i. e. persist at the time the seed is ripe), usually enlarged, and more or less altered in shape and consistence. It encloses or covers the seed or seeds till the period of maturity, when it either opens for the seed to escape, or falls to the ground with the seed. When stalked, its stalk has been termed a *carpopophore*.

147. Fruits are, in elementary works, said to be *simple* when the result of a single flower, *compound* when they proceed from several flowers closely packed or combined in a head. But as a fruit resulting from a single flower, with several distinct carpels, is compound in the sense in which that term is applied to the ovary, the terms *simple* and *aggregate*, proposed for the fruit resulting from one or several flowers, may be more appropriately adopted. In descriptive botany a fruit is always supposed to result from a single flower unless the contrary be stated. It may, like the pistil, be syncarpous or apocarpous (125); and as in many cases carpels united in the flower may become separate as they ripen, an apocarpous fruit may result from a syncarpous pistil.

148. The involucre or bracts often persist and form part of aggregate fruits, but very seldom so in single ones.

149. The receptacle becomes occasionally enlarged and succulent; if when ripe it falls off with the fruit, it is considered as forming part of it.

150. The adherent part of the calyx of epigynous flowers always persists and forms part of the fruit; the free part of the calyx of epigynous flowers or the calyx of perigynous flowers, either persists entirely at the top of or round the fruit, or the lobes alone fall off, or the lobes fall off with whatever part of the calyx is above the insertion of the petals, or the whole of what is free from the ovary falls off, including the disk bearing the petals. The calyx of hypogynous flowers usually falls off entirely or persists entirely. In general a calyx is called *deciduous* if any part falls off. When it persists it is either enlarged round or under the fruit, or it withers and dries up.

151. The corolla usually falls off entirely; when it persists it is usually withered and dry (*marcescent*), or very seldom enlarges round the fruit.

152. The stamens either fall off, or more or less of their filaments persists, usually withered and dry.

153. The style sometimes falls off or dries up and disappears; sometimes persists, forming a point to the fruit, or becomes enlarged into a wing or other appendage to the fruit.

154. The *Pericarp* is the portion of the fruit formed of the ovary, and whatever adheres to it exclusive of and outside of the seed or seeds, exclusive also of the persistent receptacle, or of whatever portion of the calyx persists round the ovary without adhering to it.

155. Fruits have often external appendages called *wings* (also, *braks*, *crests*, *awns*, etc., according to their appearance. They are either formed by persistent parts of the flower more or less altered, or grow out of the ovary or the persistent part of the calyx. If the appendage be a ring of hairs or scales round the top of the fruit, it is called a *pappus*.

156. Fruits are generally divided into *succulent* (including *fleshy*, *pulpy*, and *juicy* fruits) and *dry*. They are *dehiscent* when they open at maturity to let out the seeds, *indehiscent* when they do not open spontaneously but fall off with the seeds. Succulent fruits are usually indehiscent.

157. The principal kinds of succulent fruits are

the *Berry*, in which the whole substance of the pericarp is fleshy or pulpy, with

the exception of the outer skin or rind, called the *Epica* *yp*. The seeds themselves are usually immersed in the pulp; but in some berries, the seeds are separated from the pulp by the walls of the cavity or cells of the ovary, which forms as it were a thin inner skin or rind, called the *Endocarp*.

The *Drupe*, in which the pericarp, when ripe, consists of two distinct portions, an outer succulent one called the *Sarcocarp*, covered like the berry by a skin or epicarp, and an inner dry endocarp called the *Pit* *ec*, which is either *cartilaginous* (of the consistence of parchment) or hard and woody. In the latter case it is commonly called a *stone*, and the drupe a *stone* *fruit*. When the putamen consists of several distinct stones or nuts, each enclosing a seed, they are called *pyrenes*, or sometimes *kernels*.

158. The principal kinds of dry fruits are

the *Capsule* or *Pod*,* which is dehiscent. When ripe the pericarp usually splits longitudinally into as many pieces, called *valves*, as it contains cells or placentas. If these valves separate at the line of junction of the carpels, that is, along the line of the placentas or dissepiments, either splitting them or leaving them attached to the axis, the dehiscence is termed *sapthal*; if the valves separate between the placentas or dissepiments, the dehiscence is *loculicidal*, and the valves either bear the placentas or dissepiments along their middle line, or leave them attached to the axis. Sometimes also the capsule dehisces its seeds by *splits*, *chinks*, or *pores*, more or less regularly arranged, or bursts irregularly, or separates into two parts by a horizontal line; in the latter case it is said to be *circumsciss*.

The *Nut* or *Achene*, which is indehiscent and contains but a single seed. When the pericarp is thin in proportion to the seed it encloses, the whole fruit (or each of its lobes) has the appearance of a single seed, and is so called in popular language. If the pericarp is thin and rather loose, it is often called an *Utricle*. A *Samar* is a nut with a wing at its upper end.

159. Where the carpels of the pistil are distinct (125) they may severally become as many distinct berries, drupes, capsules, or achenes. Separate carpels are usually more or less compressed laterally, with more or less prominent inner and outer edges, called *sutures*, and, if dehiscent, the carpel usually opens at these sutures. A *Peltate* is a carpel opening at the inner suture only. In some cases where the carpels are united in the pistil they will separate when ripe; they are then called *Cocci* if one-seeded.

160. The peculiar fruits of some of the large Orders have received special names, which will be explained under each Order. Such are the *siliqua* and *silicle* of Cruciferae, the *legume* of Leguminosae, the *pome* of *Pyrus* and its allies, the *papo* of Cucurbitaceae, the *cone* of Coniferae, the *grain* or *caryopsis* of Graminae, &c.

§ 14. The Seed.

161. The **Seed** is enclosed in the pericarp in the great majority of flowering plants, called therefore *Angiosperms*, or *angiospermous plants*. In *Coniferae* and a very few allied genera, called *Gymnosperms*, or *gymnospermous plants*, the seed is naked, without any real pericarp. These truly gymnospermous plants must not be confounded with *Labiata*, *Boragin*, &c., which have also been falsely called gymnospermous, their small nuts having the appearance of seeds (158).

162. The seed when ripe contains an *embryo* or young plant, either filling or nearly filling the cavity, but not attached to the outer skin or the seed, or more or less immersed in a mealy, oily, fleshy, or horn-like substance, called the *albumen*, or *perisperm*. The presence or absence of this albumen, that is, the distinction between *albuminous* and *caulalbuminous* seeds, is one of great importance. The embryo or albumen often only be found or distinguished when the seed is quite ripe, or sometimes only when it begins to germinate.

163. The shell of the seed consists usually of two separate *coats*. The outer coat, called the *testa*, is usually the principal one, and in most cases the only one attended to in descriptions. It may be hard and *crustaceous*, woody or bony, or thin and *membranaceous*, &c. In English descriptions, *pod* is more frequently used when it is long and narrow; *capsule*, or *utricle*, &c. when it is short and thick or broad.

lustrous (skin-like), dry, or rarely succulent. It is sometimes expanded into *wings* or bears a tuft of hair, cotton, or wool, called a *coma*. The inner coat is called the *tegmen*.

164. The *funicle* is the stalk by which the seed is attached to the placenta. It is occasionally enlarged into a membranous, pulpy, or fleshy appendage, sometimes spreading over a considerable part of the seed, or nearly enclosing it, called an *aril*. A *strophiole* or *caruncle* is a similar appendage proceeding from the testa by the side of or near the funicle.

165. The *hilum* is the scar left on the seed where it separates from the funicle. The *micropyle* is a mark indicating the position of the foramen of the ovule (133).

166. The **Embryo** (162) consists of the *Radicle* or base of the future root, one or two *Cotyledons* or future seed-leaves, and the *Plumule* or future bud within the base of the cotyledons. In some seeds, especially where there is no albumen, these several parts are very conspicuous, in others they are very difficult to distinguish until the seed begins to germinate. Their observation, however, is of the greatest importance, for it is chiefly upon the distinction between the embryo with one or with two cotyledons that are founded the two great classes of phænogamous plants, *Monocotyledons* and *Dicotyledons*.

167. Although the embryo lies loose (unattached) within the seed, it is generally in some determinate position with respect to the seed or to the whole fruit. The position is described by stating the direction of the radicle next to or more or less remote from the *hilum*, or it is said to be *superior* if pointing towards the summit of the fruit, *inferior* if pointing towards the base of the fruit.

§ 15. Accessory Organs.

168. Under this name are included, in many elementary works, various external parts of plants which do not appear to act any essential part either in the vegetation or reproduction of the plant. They may be classed under four heads: *Tendrils* and *Hooks*, *Thorns* and *Prickles*, *Hairs*, and *Glands*.

169. **Tendrils** (*cirrhoi*) are usually abortive petioles, or abortive peduncles, or sometimes abortive ends of branches. They are simple or more or less branched, flexible, and coil more or less firmly round any objects within their reach, in order to support the plant to which they belong. *Hooks* are similar holdfasts, but of a firmer consistence, not branched, and less coiled.

170. **Thorns** and **Prickles** have been fancifully called the weapons of plants. A *Thorn* or *Spine* is the strongly pointed extremity of a branch, or abortive petiole, or abortive peduncle. A *Prickle* is a sharply pointed excrescence from the epidermis, and is usually produced on a branch, on the petiole or veins of a leaf, or on a peduncle, or even on the calyx or corolla. When the teeth of a leaf or the stipules are pungent they are also called *prickles*, not *thorns*. A plant is *spinous* if it has thorns, *aculeate* if it has prickles.

171. **Hairs**, in the general sense, or the *indumentum* (or clothing) of a plant, include all those productions of the epidermis which have, by a more or less appropriate comparison, been termed *bristles*, *hairs*, *down*, *cotton*, or *wool*.

172. Hairs are often branched. They are said to be *attached by the centre*, if parted from the base, and the forks spread along the surface in opposite directions; *plumose*, if the branches are arranged along a common axis, as in a feather; *stellate*, if several branches radiate horizontally. These stellate hairs have sometimes their rays connected together at the base, forming little flat circular disks attached by the centre, and are then called *scales*, and the surface is said to be *scaly* or *lepidote*.

173. The *Epidermis*, or outer skin, of an organ, as to its surface and indumentum, is *smooth*, when without any protuberance whatever.

glabrous, when without hairs of any kind.

striate, when marked with parallel longitudinal lines, either slightly raised or merely discoloured.

furrowed (sulcate) or *ribbed (costate)* when the parallel lines are more distinctly raised.

rugose, when wrinkled or marked with irregular raised or depressed lines.

umbilicate, when marked with a small round depression.

umbonate, when bearing a small boss like that of a shield.

viscous, *viscid*, or *glutinous*, when covered with a sticky or clammy exudation.

scabrous, when rough to the touch.

tuberculate or *warted*, when covered with small, obtuse, wart-like protuberances.

muricate, when the protuberances are more raised and pointed but yet short and hard.

echinate, when the protuberances are longer and sharper, almost prickly.

setose or *bristly*, when bearing very stiff erect straight hairs.

glandular-setose, when the setae or bristles terminate in a minute resinous bead or drop. In some works, especially in the case of *Roses* and *Rubus*, the meaning of *setae* has been restricted to such as are glandular.

glochidiate, when the setae are hooked at the top.

pilose, when the surface is thinly sprinkled with rather long simple hairs.

hispid, when more thickly covered with rather stiff hairs.

hirsute, when the hairs are dense and not so stiff.

downy or *pubescent*, when the hairs are short and soft; *puberulent*, when slightly pubescent.

strigose, when the hairs are rather short and stiff, and lie close along the surface all in the same direction; *strigillose*, when slightly strigose.

tomentose or *woolly*, when the hairs are very short and soft, rather dense and more or less intricate, and usually white or whitish.

woolly (*lanate*), when the hairs are long and loosely intricate, like wool. The wool or tomentum is said to be *floccose* when closely intricate and readily detached, like fleece.

mealy (*farinose*), when the hairs are excessively short, intricate and white, and come off readily, having the appearance of meal or dust.

canescent or *hoary*, when the hairs are so short as not readily to be distinguished by the naked eye, and yet give a general whitish hue to the epidermis.

glaucous, when of a pale bluish-green, often covered with a fine bloom.

174. The meanings here attached to the above terms are such as appear to have been most generally adopted, but there is much vagueness in the use practically made of many of them by different botanists. This is especially the case with the terms *pilose*, *hispid*, *hirsute*, *pubescent*, and *tomentose*.

175. The name of **Glands** is given to several different productions, and principally to the four following:—

1. Small wart-like or shield-like bodies, either sessile or sometimes stalked, of a fungous or somewhat fleshy consistence, occasionally secreting a small quantity of oily or resinous matter, but more frequently dry. They are generally few in number, often definite in their position and form, and occur chiefly on the petiole or principal veins of leaves, on the branches of inflorescences, or on the stalks or principal veins of bracts, sepals, or petals.

2. Minute raised dots, usually black, red, or dark-coloured, of a resinous or oily nature, always superficial, and apparently exudations from the epidermis. They are often numerous on leaves, bracts, sepals, and green branches, and occur even on petals and stamens, more rarely on pistils. When raised upon slender stalks they are called *pedicellate* (or *stipitate*) glands, or *glandular hairs*, according to the thickness of the stalk.

3. Small, globular, oblong or even linear vesicles, filled with oil, imbedded in the substance itself of leaves, bracts, floral organs, or fruits. They are often very numerous, like transparent dots, sometimes few and determinate in form and position. In the pericarp of *Umbelliferae* they are remarkably regular and conspicuous, and take the name of *ritter*.

4. Lobes of the disk (137), or other small fleshy excrescences within the flower, whether from the receptacle, calyx, corolla, stamens, or pistil.

CHAP. II. CLASSIFICATION, OR SYSTEMATIC BOTANY.

176. It has already been observed (3) that descriptions of plants should, as nearly as possible, be arranged under natural divisions, so as to facilitate the comparison of each plant with those most nearly allied to it. The descriptions of plants here alluded to are descriptions of *species*; the natural divisions of the Flora refer to natural *groups of species*.

177. A **Species** comprises all the individual plants which resemble each other sufficiently to make us conclude that they are all, or *may have been* all, descended from a common parent. These individuals may often differ from each other in many striking particulars, such as the colour of the flower, size of the leaf, etc., but these particulars are such as experience teaches us are liable to vary in the seedlings raised from one individual.

178. When a large number of the individuals of a species differ from the others in any striking particular they constitute a **Variety**. If the variety generally comes true from seed, it is often called a *Race*.

179. A *Variety* can only be propagated with certainty by grafts, cuttings, bulbs, tubers, or any other method which produces a new plant by the development of one or more buds taken from the old one. A *Race* may with care be propagated by seed, although seedlings will always be liable, under certain circumstances, to lose those particulars which distinguish it from the rest of the species. A real *Species* will always come true from seed.

180. The known species of plants (now near 100,000) are far too numerous for the human mind to study without classification, or even to give distinct single names to. To facilitate these objects, an admirable system, invented by Linnaeus, has been universally adopted, viz. one common substantive name is given to a number of species which resemble each other more than they do any other species; the species so collected under one name are collectively called a **Genus**, the common name being the *generic* name. Each species is then distinguished from the others of the same genus by the addition of an adjective epithet or *specific name*. Every species has thus a botanical name of two words. In Latin, the language usually used for the purpose, the first word is a substantive and designates the genus; the second, an adjective, indicates the species.

181. The genera thus formed being still too numerous (above 6,000) for study without further arrangement, they have been classed upon the same principles; viz. genera which resemble each other more than they do any other genera, have been collected together into groups of a higher degree called **Families** or **Natural Orders**, to each of which a common name has been given. This name is in Latin an adjective plural, usually taken from the name of some one *typical* genus, generally the best known, the first discovered, or the most marked (e.g. *Ranunculacea* from *Ranunculus*). This is however for the purpose of study and comparison. To speak of a species, to refer to it and identify it, all that is necessary is to give the generic and specific names.

182. Natural Orders themselves (of which we reckon near 200) are often in the same manner collected into **Classes**; and where Orders contain a large number of genera, or genera a large number of species, they require further classification. The genera of an Order are then collected into minor groups called *Tribes*, the species of a genus into *Sections*, and in a few cases this intermediate classification is carried still further. The names of these several groups the most generally adopted are as follows, beginning with the most comprehensive or highest:—

Classes.	Genera.
Subclasses or Alliances.	Subgenera.
Natural Orders or Families.	Sections.
Suborders.	Subsections.
Tribes.	Species.
Subtribes.	Varieties.
Divisions.	
Subdivisions.	

183. The characters (3) by which a species is distinguished from all other species of

the same genus are collectively called the *specific character* of the plant : those by which its genus is distinguished from other genera of the Order, or its Order from other Orders, are respectively called the *generic* or *ordinal* character, as the case may be. The *habit* of a plant, of a species, a genus, etc., consists of such general characters as strike the eye at first sight, such as size, colour, ramification, arrangement of the leaves, inflorescence, etc., and are chiefly derived from the organs of vegetation.

184. Classes, Orders, Genera, and their several subdivisions, are called *natural* when, in forming them, all resemblances and differences are taken into account, valuing them according to their evident or presumed importance ; *artificial*, when resemblances and differences in some one or very few particulars only are taken into account independently of all others.

185. The number of species included in a genus, or the number of genera in an Order, is very variable. Sometimes two or three or even a single species may be so different from all others as to constitute the entire genus ; in others, several hundred species may resemble each other so much as to be all included in one genus ; and there is the same discrepancy in the number of genera to a Family. There is moreover, unfortunately, in a number of instances, great difference of opinion as to whether certain plants differing from each other in certain particulars are varieties of one species or belong to distinct species ; and again, whether two or more groups of species should constitute as many sections of one genus, or distinct genera, or tribes of one Order, or even distinct Natural Orders. In the former case, as a species is supposed to have a real existence in nature, the question is susceptible of argument, and sometimes of absolute proof. But the place a group should occupy in the scale of degree is very arbitrary, being often a mere question of convenience. The more subdivisions upon correct principles are multiplied, the more they facilitate the study of plants, provided always the main resting-points for constant use, the Order and the Genus, are comprehensive and distinct. But if every group into which a genus can be divided be erected into a distinct genus, with a substantive name to be remembered whenever a species is spoken of, all the advantages derived from the beautiful simplicity of the Linnæan nomenclature are gone.

CHAP. III. VEGETABLE ANATOMY AND PHYSIOLOGY.

§ 1. *Structure and Growth of the Elementary Tissues.*

186. If a very thin slice of any part of a plant be placed under a microscope of high magnifying power, it will be found to be made up of variously shaped and arranged ultimate parts, forming a sort of honeycombed structure. These ultimate parts are called *cells*, and form by their combination the *elementary tissues* of which the entire plant is composed.

187. A cell in its simplest state is a closed membranous sac, formed of a substance permeable by fluids, though usually destitute of visible pores. Each cell is a distinct individual, separately formed and separately acting, though cohering with the cells with which it is in contact, and partaking of the common life and action of the tissue of which it forms a part. The membranes separating or enclosing the cells are also called their *walls*.

188. Botanists usually distinguish the following tissues :—

(1) *Cellular tissue*, or *parenchyma*, consists usually of thin-walled cells, more or less round in form, or with their length not much exceeding their breadth, and not tapering at the ends. All the soft parts of the leaves, the pith of stems, the pulp of fruits, and all young growing parts, are formed of it. It is the first tissue produced, and continues to be formed while growth continues, and when it ceases to be active the plant dies.

(2) *Woody tissue*, or *prosenchyma*, differs in having its cells considerably longer than broad, usually tapering at each end into points and overlapping each other. The cells are commonly thick-walled ; the tissue is firm, tenacious, and elastic, and constitutes

the principal part of wood, of the inner bark, and of the nerves and veins of leaves forming, in short, the framework of the plant.

(3) *Vascular tissue*, or the *vessels* or *ducts* of plants, so called from the mistaken notion that their functions are analogous to those of the vessels (veins and arteries) of animals. A *vessel* in plants consists of a vertical row of cells, which have their transverse partition-walls obliterated, so as to form a continuous tube. All phænogamous plants, as well as ferns and a few other cryptogamous plants, have vessels, and are therefore called *vascular plants*; so the majority of cryptogams having only cellular tissue are termed *cellular plants*. Vessels have their sides very variously marked; some, called *spiral vessels*, have a spiral fibre coiled up their inside, which unrolls when the vessel is broken; others are marked with longitudinal slits, cross bars, minute dots or pits, or with transverse rings. The size of vessels is also very variable in different plants; in some they are of considerable size and visible to the naked eye in cross sections of the stem, in others they are almost absent or can only be traced under a strong magnifier.

189. Various modifications of the above tissues are distinguished by vegetable anatomists under names which need not be enumerated here as not being in general practical use. *Air-vessels*, *cysts*, *turpentine-vessels*, *oil-reservoirs*, etc., are either cavities left between the cells, or large cells filled with peculiar secretions.

190. When tissues are once formed, they increase, not by the general enlargement of the whole of the cells already formed, but by *cell-division*, that is, by the division of young and vitally active cells, and the enlargement of their portions. In the formation of the embryo, the first cell of the new plant is formed, not by division, but around a segregate portion of the contents of a previously existing cell, the embryo-sac. This is termed *free cell-formation*, in contradistinction to cell-division.

191. A young and vitally active cell consists of the *outer wall*, formed of a more or less transparent substance called *cellulose*, permeable by fluids, and of ternary chemical composition (carbon, hydrogen, and oxygen); and of the *cell-contents*, usually viscid or mucilaginous, consisting of *protoplasm*, a substance of quaternary chemical composition (carbon, hydrogen, oxygen, and nitrogen), which fills an important part in cell-division and growth. Within the cell (either in the centre or excentrical) is usually a minute, soft, subgelatinous body called the *nucleus*, whose functions appear to be intimately connected with the first formation of the new cell. As this cell increases in size, and its walls in thickness, the protoplasm and watery cell-sap become absorbed or dried up, the firm cellulose wall alone remaining as a permanent fabric, either empty or filled with various organized substances produced or secreted within it.

192. The principal organized contents of cells are
sap, the first product of the digestion of the food of plants; it contains the elements of vegetable growth in a dissolved condition.

sugar, of which there are two kinds, called *cane-sugar* and *grape-sugar*. It usually exists dissolved in the sap. It is found abundantly in growing parts, in fruits, and in germinating seeds.

dextrine, or vegetable mucilage, a gummy substance, between mucilage and starch.
starch or *fecula*, one of the most universal and conspicuous of cell-contents, and often so abundant in farinaceous roots and seeds as to fill the cell-cavity. It consists of minute grains called *starch-granules*, which vary in size and are marked with more or less conspicuous concentric lines of growth. The chemical constitution of starch is the same as that of cellulose; it is unaffected by cold water, but forms a jelly with boiling water, and turns blue when tested by iodine. When fully dissolved it is no longer starch, but dextrine.

chlorophyll, very minute granules, containing nitrogen, and coloured green under the action of sunlight. These granules are most abundant in the layers of cells immediately below the surface or epidermis of leaves and young bark. The green colouring matter is soluble in alcohol, and may thus be removed from the granules.

chromule, a name given to a similar colouring matter when not green.

wax, *oils*, *camphor*, and *resinous* matter, are common in cells or in cavities in the tissues between the cells, also various mineral substances, either in an amorphous state or as microscopic crystals, when they are called *Raphides*.

§ 2. *Arrangement of the Elementary Tissues, or Structure of the Organs of Plants.*

193. Leaves, young stems, and branches, and most parts of phænogamous plants, during the first year of their existence consistently of

1, a *cellular system*, or continuous mass of cellular tissue, which is developed both vertically as the stem or other parts increase in length, and horizontally or laterally as they increase in thickness or breadth. It surrounds or is intermixed with the fibro-vascular system, or it may exist alone in some parts of phænogamous plants, as well as in cryptogamous ones.

2, a *fibro-vascular system*, or continuous mass of woody and vascular tissue, which is gradually introduced vertically into, and serves to bind together, the cellular system. It is continued from the stem into the petioles and veins of the leaves, and into the pedicels and parts of the flowers, and is never wholly wanting in any phænogamous plant.

3, an *epidermis*, or outer skin, formed of one or more layers of flattened (horizontal), finely coherent, and usually empty cells, with either thin and transparent or thick and opaque walls. It covers almost all parts of plants exposed to the outward air, protecting their tissues from its immediate action, but is wanting in those parts of aquatic plants which are constantly submerged.

194. The epidermis is frequently pierced by minute spaces between the cells, called *stomates*. They are oval or mouth-shaped, bordered by *Ulex*, formed of two or more elastic cells so disposed as to cause the stomate to open in a moist, and to close up in a dry state of the atmosphere. They communicate with intercellular cavities, and are obviously designed to regulate evaporation and respiration. They are chiefly found upon leaves, especially on the under surface.

195. When a phænogamous plant has outlived the first season of its growth the anatomical structure of its stem or other perennial parts becomes more complicated and very different in the two great classes of phænogamous plants called *Exogens* and *Endogens*, which correspond with very few exceptions to the two classes *Dicotyledons* and *Monocotyledons* (167), founded on the structure of the embryo. In *Exogens* (*Dicotyledons*) the woody system is placed in concentric layers between a *central pith* (198, 1), and an external separable *bark* (198, 5). In *Endogens* (*Monocotyledons*) the woody system is in separate small bundles or fibres running through the cellular system without apparent order, and there is usually no distinct central pith, nor outer separable bark.

196. The anatomical structure is also somewhat different in the different organs of plants. In the **Root**, although it is constructed generally on the same plan as the stem, yet the regular organization, and the difference between *Exogens* and *Endogens*, is often disguised or obliterated by irregularities of growth, or by the production of large quantities of cellular tissue filled with starch or other substances (192). There is seldom, if ever, any distinct pith, the concentric circles of fibro-vascular tissue in *Exogens* are often very indistinct or have no relation to seasons of growth, and the epidermis has no stomates.

197. In the **Stem** or branches, during the first year or season of their growth, the difference between *Exogens* and *Endogens* is not always very conspicuous. In both there is a tendency to a circular arrangement of the fibro-vascular system, leaving the centre either vacant or filled with cellular tissue (pith) only, and a more or less distinct outer rind is observable even in several *Endogens*. More frequently, however, the distinction is already very apparent the first season, especially towards its close. The fibro-vascular bundles in *Endogens* usually anastomose but little, passing continuously into the branches and leaves. In *Exogens* the circle of fibro-vascular bundles forms a more continuous cylinder of network emitting lateral offsets into the branches and leaves.

198. The *Exogenous* stem, after the first year of its growth, consists of

1, the *pith*, a cylinder of cellular tissue, occupying the centre or longitudinal axis of the stem. It is active only in young stems or branches, becomes dried up and compressed as the wood hardens, and often finally disappears, or is scarcely distinguishable in old trees.

2, the *medullary sheath*, which surrounds and encases the pith. It abounds in spiral vessels (188, 3), and is in direct connection, when young, with the leaf-buds and

branches, with the petioles and veins of leaves, and other ramifications of the system. Like the pith, it gradually disappears in old wood.

3, the *wood*, which lies immediately outside the medullary sheath. It is formed of woody tissue (188, 2), through which, in most cases, vessels (188, 3) variously disposed are interspersed. It is arranged in annual concentric circles (211), which usually remain active during several years, but in older stems the central and older layers become hard, dense, comparatively inactive, and usually deeper coloured, forming what is called *heart-wood* or *duramen*, the outer, younger, and usually paler-coloured living layers constituting the *sapwood* or *alburnum*.

4, the *medullary rays*, which form vertical plates, originating in the pith, and radiating from thence, traverse the wood and terminate in the bark. They are formed of cellular tissue, keeping up a communication between the living portion of the centre of the stem and its outer surface. As the heart-wood is formed, the inner portion of the medullary rays ceases to be active, but they usually may still be seen in old wood forming what carpenters call the *silver grain*.

5, the *bark*, which lies outside the wood, within the epidermis. It is, like the wood, arranged in annual concentric circles (211), of which the outer older ones become dry and hard, forming the *corky layer* or *outer bark*, which, as it is distended by the thickening of the stem, either cracks or is cast off with the epidermis, which is no longer distinguishable. Within the corky layer is the *cellular*, or *green*, or *middle bark*, formed of loose thin-walled pulpy cells containing chlorophyll (192); and which is usually the layer of the preceding season. The innermost and youngest circle, next the young wood, is the *liber* or *inner bark*, formed of long tough woody tissue called *bast-cells*.

199. The Endogenous stem, as it grows old, is not marked by the concentric circles of Exogens. The wood consists of a *matrix* of cellular tissue irregularly traversed by vertical cords or bundles of woody and vascular tissue, which are in connection with the leaves. These vascular bundles change in structure and direction as they pass down the stem, losing their vessels, they retain only their bast- or long wood-cells, usually curving outwards towards the rind. The old wood becomes more compact and harder towards the circumference than in the centre. The epidermis or rind either hardens so as to prevent any increase of diameter in the stem, or it distends, without increasing in thickness or splitting or casting off any outer layers.

200. In the *Leaf*, the structure of the petioles and principal ribs or veins is the same as that of the young branches of which they are ramifications. In the expanded portion of the leaf the fibro-vascular system becomes usually very much ramified, forming the smaller veins. These are surrounded and the interstices filled up by a copious and very active cellular tissue. The majority of leaves are horizontal, having a differently constructed upper and under surface. The cellular stratum forming the upper surface consists of closely set cells, placed vertically, with their smallest ends next the surface, and with few or no stomates in the epidermis. In the stratum forming the under surface, the cells are more or less horizontal, more loosely placed, and have generally empty spaces between them, with stomates in the epidermis communicating with these intercellular spaces. In vertical leaves (as in a large number of Australian plants) the two surfaces are nearly similar in structure.

201. When leaves are reduced to scales, acting only as protectors of young buds, or without taking any apparent part in the economy of vegetable life, their structure, though still on the same plan, is more simple; their fibro-vascular system is less ramified, their cellular system more uniform, and there are few or no stomates.

202. Bracts and floral envelopes, when green and much developed, resemble leaves in their anatomical structure, but in proportion as they are reduced to scales or transformed into petals, they lose their stomates, and their systems, both fibro-vascular and cellular, become more simple and uniform, or more slender and delicate.

203. In the stamens and pistils the structure is still nearly the same. The fibro-vascular system, surrounded by and intermixed with the cellular tissue, is usually simple in the filaments and style, more or less ramified in the flattened or expanded parts, such as the anther-cases, the walls of the ovary, or carpellary leaves, etc. The pollen consists of granular cells variously shaped, marked, or combined, peculiar forms being constant in the same species, or often in large genera, or even Orders. The stigmatic portion of the pistil is a mass of loosely cellular substance, destitute of epidermis, and

usually is in communication with the ovary by a channel running down the centre of the style.

204. Tubers, fleshy thickenings of the stem or other parts of the plant, succulent leaves or branches, the fleshy, woolly, or bony parts of fruits, the albumen, and the thick fleshy parts of embryos, consist chiefly of largely developed cellular tissue, replete with starch or other substances (192), deposited apparently in most cases for the eventual future use of the plant or its parts when recalled into activity at the approach of a new season.

205. Hairs (171) are usually expansions or processes of the epidermis, and consist of one or more cells placed end to end. When thick or hardened into prickles, they still consist usually of cellular tissue only. Thorns (170) contain more or less of a fibro-vascular system, according to their degree of development.

206. Glands, in the primary sense of the word (175, 1), consist usually of a rather loose cellular tissue without epidermis, and often replete with resinous or other substances.

§ 3. Growth of the Organs.

207. Roots grow in length constantly and regularly at the extremities only of their fibres, in proportion as they find the requisite nutriment. They form no buds containing the germ of future branches, but their fibres proceed irregularly from any part of their surface without previous indication, and when their growth has been stopped for a time, either wholly by the close of the season, or partially by a deficiency of nutriment at any particular spot, it will, on the return of favourable circumstances, be resumed at the same point, if the growing extremities be uninjured. If during the dead season, or at any other time, the growing extremity is cut off, dried up, or otherwise injured, or stopped by a rock or other obstacle opposing its progress, lateral fibres will be formed on the still living portion; thus enabling the root as a whole to diverge in any direction, and travel far and wide when lured on by appropriate nutriment.

208. This growth is not however by the successive formation of terminal cells: attaining at once their full size. The cells first formed on a fibre commencing or renewing its growth, will often dry up and form a kind of terminal cap, which is pushed on as cells are formed immediately under it; and the new cells, constituting a greater or lesser portion of the ends of the fibres, remain some time in a growing state before they have attained their full size.

209. The roots of Exogens, when perennial, increase in thickness like stems by the addition of concentric layers, but these are usually much less distinctly marked; and in a large number of perennial Exogens and most Endogens the roots are annual, perishing at the close of the season, fresh adventitious roots springing from the stock when vegetation commences the following season.

210. The Stem, including its branches and appendages (leaves, floral organs, etc.), grows in length by additions to its extremity, but a much greater proportion of the extremity and branches remains in a growing and expending state for a much longer time than in the case of the root. At the close of one season, leaf-buds or seeds are formed, each containing the germ of a branch or young plant to be produced the following season. At a very early stage of the development of these buds or seeds, a commencement may be found of many of the leaves it is to bear; and before a leaf unfolds, every leaflet of which it is to consist, every lobe or tooth which is to mark its margin, may often be traced in miniature, and thenceforth till it attains its full size, the branch grows and expands in every part. In some cases however the lower part of a branch and more rarely (*e.g.* in some *Meliaceæ*) the lower part of a compound leaf attains its full size before the young leaves or leaflets of the extremity are yet formed.

211. The perennial stem, if exogenous (198), grows in thickness by the addition every season of a new layer or ring of wood between the outermost preceding layer and the inner surface of the bark, and by the formation of a new layer or ring of bark within the innermost preceding layer and outside the new ring of wood, thus forming a succession of concentric circles. The sap elaborated by the leaves finds its way, in a manner not as yet absolutely ascertained, into the *cambium-region*, a zone of tender thin-walled cells connecting the wood with the bark, by the division and enlargement of which new

cells (190) are formed. These cells separate in layers, the inner ones constituting the new ring of wood, and the outer ones the new bark or liber. In most exogenous trees, in temperate climates, the seasons of growth correspond with the years, and the rings of wood remain sufficiently distinct to indicate the age of the tree; but in many tropical and some evergreen trees, two or more rings of wood are formed in one year.

212. In endogenous perennials (199), the new wood or woody fibre is formed towards the centre of the stem, or irregularly mingled with the old. The stem consequently either only becomes more dense without increasing in thickness, or only increases by gradual distention, which is never very considerable. It affords therefore no certain criterion for judging of the age of the tree.

213. Flowers have generally all their parts formed, or indicated by protuberances or growing cells at a very early stage of the bud. These parts are then usually more regularly placed than in the fully developed flower. Parts which afterwards unite are then distinct, many are present in this rudimentary state which are never further developed, and parts which are afterwards very unequal or dissimilar are perfectly alike at this early period. On this account flowers in this very early stage are supposed by some modern botanists to be more *normal*, that is, more in conformity to a supposed type; and the study of the early formation and growth of the floral organs, called *Organogenesis*, has been considered essential for the correct appreciation of the affinities of plants. In some cases, however, it would appear that modifications of development, not to be detected in the very young bud, are yet of great importance in the distinction of large groups of plants, and that *Organogenesis*, although it may often assist in clearing up a doubtful point of affinity, cannot nevertheless be exclusively relied on in estimating the real value of peculiarities of structure.

214. The flower is considered as a *bud* (*flower-bud*, *calastrum*) until the perianth expands, the *period of flowering* (*anthesis*) is that which elapses from the first expanding of the perianth, till the pistil is set or begins to enlarge, or, when it does not set, until the stamens and pistil wither or fall. After that, the enlarged ovary takes the name of *young fruit*.

215. At the close of the season of growth, at the same time as the leaf-buds or seeds are formed containing the germ of future branches or plants, many plants form also, at or near the bud or seed, large deposits, chiefly of starch. In many cases, such as the tubers of a potato or other root-tock, the scales or thickened base of a bulb, the albescent or the thick cotyledon of a seed, this deposit appears to be a store of nutriment which is partially absorbed by the young branch or plant during its first stage of growth, before the roots are sufficiently developed to supply it from without. In some cases, however, such as the fleshy thickening of some stems or peduncles, the pericarp of fruits which perish long before *germination* (the first growth of the seed), neither the use nor the cause of these deposits has as yet been clearly explained.

§ 4. Functions of the Organs.

216. The functions of the Root are, 1. To fix the plant in or to the soil or other substance on which it grows. 2. To absorb nourishment from the soil, water, or air into which the fibres have penetrated (or from other plants in the case of parasites), and to transmit it rapidly to the stem. The absorption takes place through the young growing extremities of the fibres, and through a peculiar kind of hairs or absorbing organs which are formed at or near these growing extremities. The transmission to the stem is through the tissues of the root itself. The nutriment absorbed consists chiefly of carbonic acid and nitrogen or nitrogenous compounds dissolved in water. 3. In some cases roots secrete or exude small quantities of matter in a manner and with a purpose not satisfactorily ascertained.

217. The Stem and its branches support the leaves, flowers, and fruit, transmit the crude sap, or nutriment absorbed by the roots and mixed with previously organized matter, to the leaves, and re-transmit the assimilated or elaborated sap from the leaves to the growing parts of the plant, to be there used up, or to form deposits for future use (201). The transmission of the ascending crude sap appears to take place chiefly through the elongated cells associated with the vascular tissues, passing from one cell to another by a process but little understood, but known by the name of *endosmosis*.

218. Leaves are functionally the most active of the organs of vegetation. In them is chiefly conducted digestion or *Assimilation*, a name given to the process which accomplishes the following results:—1. The chemical decomposition of the oxygenated matter of the sap, the absorption of carbonic acid, and the liberation of pure oxygen at the ordinary temperature of the air. 2. A counter-operation by which oxygen is absorbed from the atmosphere and carbonic acid is exhaled. 3. The transformation of the residue of the crude sap into the organized substances which enter into the composition of the plant. The exhalation of oxygen appears to take place under the influence of solar heat and light, chiefly from the under surface of the leaf, and to be in some measure regulated by the stomates; the absorption of oxygen goes on always in the dark, and in the daytime also in certain cases. The transformation of the sap is effected within the tissues of the leaf and continues probably more or less throughout the active parts of the whole plant.

219. The Floral Organs seldom contribute to the growth of the plant on which they are produced; their functions are wholly concentrated on the formation of the seed with the germ of a future plant.

220. The Perianth (calyx and corolla) acts in the first instance in protecting the stamens and pistils during the early stages of their development. When expanded, the use of the brilliant colours which they often display, of the sweet or stringy odours they emit, has not been adequately explained. Perhaps they may have great influence in attracting those insects whose concurrence has been shown in many cases to be necessary for the due transmission of the pollen from the anther to the stigma.

221. The pistil, when stimulated by the action of the pollen, forms and nourishes the young seed. The varied and complicated contrivances by which the pollen is conveyed to the stigma, whether by distillation of the organs themselves, or with the assistance of wind, of insects, or other extraneous agents, have been the subject of numerous observations and experiments of the most distinguished naturalists, and are yet far from being fully investigated. Their details, however, as far as known, would be far too long for the present outline.

222. The fruit nourishes and protects the seed until its maturity, and then often promotes its dispersion by a great variety of contrivances or apparently collateral circumstances, *e.g.* by an elastic dislancee which casts the seed off to a distance; by the development of a papae, wings, hooked or other appendages, which allows them to be carried off by winds, or by animals, etc., to which they may adhere; by their small specific gravity, which enables them to float down streams; by their attractions to birds, etc., who taking them for food drop them often at great distances, etc. Appendages to the seeds themselves also often promote dispersion.

223. Hairs have various functions. The ordinary indumentum (171) of stems and leaves indeed seems to take little part in the economy of the plant besides perhaps some occasional protection against injurious atmospheric influences, but the root-hairs (216) and the absorbents, the hairs on styles and other parts of flowers appear often materially to assist the transmission of pollen, and the exudations of glandular hairs (175, 2) are often too copious not to exercise some influence on the phenomena of vegetation. The whole question, however, of vegetable excretions and their influence on the economy of vegetable life, is as yet but imperfectly understood.

CHAP. IV. COLLECTION, PRESERVATION, AND DETERMINATION OF PLANTS.

224. Plants can undoubtedly be most easily and satisfactorily examined when freshly gathered. But time will rarely admit of this being done, and it is moreover desirable to compare them with other plants previously observed or collected. *Specimens* must, therefore, be selected for leisurely observation at home, and preserved for future reference. A collection of such specimens constitutes a *Herbarium*.

225. A botanized *Specimen*, to be perfect, should have *root, stem, leaves, flowers* (both open and in the bud), and *fruit* (both young and mature). It is not, however, always possible to gather such complete specimens, but the collector should aim at

completeness. Fragments, such as leaves without flowers, or flowers without leaves, are of little or no use.

226. If the plant is small (not exceeding 15 in.) or can be reduced to that length by folding, the specimen should consist of the whole plant, including the principal part of the root. If it be too large to preserve the whole, a good flowering-branch should be selected, with the foliage as low down as can be gathered with it; and one or two of the lower stem-leaves or radical leaves, if any, should be added, so as to preserve as much as possible of the peculiar aspect of the plant.

227. The specimens should be taken from healthy uninjured plants of a medium size. Or if a specimen be gathered because it looks a little different from the majority of those around it, apparently belonging to the same species, a specimen of the more prevalent form should be taken from the same locality for comparison.

228. For bringing the specimens home, a light portfolio of pasteboard, covered with calico or leather, furnished with straps and buckles for closing, and another for slinging on the shoulder, and containing a few sheets of stout coarse paper, is better than the old-fashioned tin box (except, perhaps, for stiff prickly plants and a few others). The specimens as gathered are placed between the leaves of paper, and may be crowded together if not left long without sorting.

229. If the specimen brought home be not immediately determined when fresh, but dried for future examination, a note should be taken of the time, place, and situation in which it was gathered; of the stature, habit, and other particulars relating to any tree, shrub, or herb of which the specimen is only a portion; of the kind of root it has; of the colour of the flower; or of any other particulars which the specimen itself cannot supply, or which may be lost in the process of drying. These memoranda, whether taken down in the field, or from the living specimen when brought home, should be written on a label attached to the specimen or preserved with it.

230. To dry specimens, they are laid flat between several sheets of bibulous paper and subjected to pressure. The paper is subsequently changed at intervals, until they are dry.

231. In laying out the specimen, care should be taken to preserve the natural position of the parts as far as consistent with the laying flat. In general, if the specimen is fresh and not very slender, it may be simply laid on the lower sheet, holding it by the stalk and drawing it slightly downwards; then, as the upper sheet is laid over, if it be slightly drawn downwards as it is pressed down, it will be found, after a few trials, that the specimen will have retained a natural form with very little trouble. If the specimen has been gathered long enough to have become flaccid, it will require more care in laying the leaves flat and giving the parts their proper direction. Specimens kept in tin boxes, will also often have taken unnatural bends which will require to be corrected.

232. If the specimen is very bushy, some branches must be thinned out, but always so as to show where they have been. If any part, such as the head of a thistle, the stem of an *Orobanche*, or the bulb of a Lily, be very thick, a portion of what is to be the under side of the specimen may be sliced off. Some thick specimens may be split from top to bottom before drying.

233. If the specimen be succulent or tenacious of life, such as a *Sedum* or an *Orchis*, it may be dipped in boiling water *all but the flowers*. This will kill the plant at once, and enable it to be dried rapidly, losing less of its colour or foliage than would otherwise be the case. Dipping in boiling water is also useful in the case of Heaths and other plants which are apt to shed their leaves during the process of drying.

234. Plants with very delicate corollas may be placed between single leaves of very thin unglazed tissue paper. In shifting these plants into dry paper the tissue-paper is not to be removed, but lifted with its contents on to the dry paper.

235. The number of sheets of paper to be placed between each specimen or sheet of specimens, will depend, on the one hand, on the thickness and humidity of the specimens; on the other hand, on the quantity and quality of the paper one has at command. The more and the better the paper, the less frequently will it be necessary to change

it, and the sooner the plants will dry. The paper ought to be coarse, stout, and unsized. Common blotting-paper is much too tender.

236. Care must be taken that the paper used is well dried. If it be likewise hot, all the better; but it must then be very dry; and wet plants put into hot paper will require changing very soon, to prevent their turning black, for hot damp without ventilation produces fermentation, and spoils the specimens.

237. For pressing plants, various more or less complicated and costly presses are made. None is better than a pair of boards the size of the paper, and a stone or other heavy weight upon them if at home, or a pair of strong leather straps round them if travelling. Each of these boards should be double, that is, made of two layers of thin boards, the opposite way of the grain, and joined together by a row of clenched brads round the edge, without glue. Such boards, in deal, rather less than half an inch thick (each layer about $2\frac{1}{2}$ lines) will be found light and durable.

238. It is useful also to have extra boards or pasteboards the size of the paper, to separate thick plants from thin ones, wet ones from those nearly dry, etc. Open wooden frames with cross-bars, or frames of strong wire-work lattice, are still better than boards for this purpose, as accelerating the drying by promoting ventilation.

239. The more frequently the plants are shifted into dry paper the better. Excepting for very stiff or woody plants, the first pressure should be light, and the first shifting, if possible, after a few hours. Then, or at the second shifting, when the specimens will have lost their elasticity, will be the time for putting right any part of a specimen which may have taken a wrong fold or a bad direction. After this the pressure may be gradually increased, and the plants left from one to several days without shifting. The exact amount of pressure to be given will depend on the consistence of the specimens and the amount of paper. It must only be borne in mind that too much pressure crushes the delicate parts, too little allows them to shrivel, in both cases interfering with their future examination.

240. The most convenient specimens will be made, if the drying-paper is the same size as that of the herbarium in which they are to be kept. That of writing-demy, rather more than 16 inches by $10\frac{1}{2}$ inches, is a common and very convenient size. A small size reduces the specimens too much, a large size is both costly and inconvenient for use.

241. When the specimens are quite dry and stiff, they may be packed up in bundles with a single sheet of paper between each layer, and this paper need not be bibulous. The specimens may be placed very closely on the sheets, but not in more than one layer on each sheet, and care must be taken to protect the bundles by sufficient covering from the effects of external moisture or the attacks of insects.

242. In laying the specimens into the herbarium, no more than one species should ever be fastened on one sheet of paper, although several specimens of the same species may be laid side by side. And throughout the process of drying, packing, and laying in, great care must be taken that the labels be not separated from the specimens they belong to.

243. To examine or dissect flowers or fruits in dried specimens it is necessary to soften them. If the parts are very delicate, this is best done by gradually moistening them in cold water; in most cases, steeping them in boiling water or in steam is much quicker. Very hard fruits and seeds will require boiling to be able to dissect them easily.

244. For dissecting and examining flowers in the field, all that is necessary is a pen-knife and a pocket-lens of two or three glasses from 1 to 2 inches focus. At home it is more convenient to have a mounted lens or simple microscope, with a stage holding a glass plate, upon which the flowers may be laid; and a pair of dissectors, one of which should be narrow and pointed, or a mere point, like a thick needle, in a handle; the other should have a pointed blade, with a sharp edge, to make clean sections across the ovary. A compound microscope is rarely necessary, except in cryptogamic botany and vegetable anatomy. For the simple microscope, lenses of $\frac{1}{4}$, $\frac{1}{2}$, 1, and $1\frac{1}{2}$ inches focus are sufficient.

245. To assist the student in determining or ascertaining the name of a plant belonging to a Flora, analytical tables should be prefixed to the Orders, Genera, and

Species. These tables should be so constructed as to contain, under each bracket, two (rarely three or more) alternatives as nearly as possible contradictory or incompatible with each other, each alternative referring to another bracket, having under it another pair of alternatives further indented. The student having a plant to determine, will first take the general table of Natural Orders, and examine his plant at each step to see which alternative agrees with it, will be led on to the Order to which it belongs; he will then compare it with the detailed character of the Order given in the text. If it agrees, he will follow the same course with the table of the genera of that Order, and again with the table of species of the genus. But in each case, if he finds that his plant does not agree with the detailed description of the genus or species to which he has thus been referred, he must revert to the beginning and carefully go through every step of the investigation before he can be satisfied. A fresh examination of his specimen, or of others of the same plant, a critical consideration of the meaning of every expression in the characters given, may lead him to detect some minute point overlooked or mistaken, and put him into the right way. Species vary within limits which it is often very difficult to express in words, and it proves often impossible, in framing these analytical tables, so to divide the genera and species that those which come under one alternative should absolutely exclude the others. In such doubtful cases both alternatives must be tried before the student can come to the conclusion that his plant is not contained in the Flora, or that it is erroneously described.

216. In those Floras where analytical tables are not given, the student is usually guided to the most important or prominent characters of each genus or species, either by a general summary prefixed to the genera of an Order or to the species of the genus, for all such genera or species; or by a special summary immediately preceding the detailed description of each genus or species. In the latter case this summary is called a *diagnosis*. Or sometimes the important characters are only indicated by italicizing them in the detailed description.

217. It may also happen that the specimen gathered may present some occasional or accidental anomalies peculiar to that single one, or to a very few individuals, which may prevent the species from being at once recognized by its technical characters. It may be useful here to point out a few of these anomalies which the botanist may be most likely to meet with. For this purpose we may divide them into two classes, viz.

1. *Aberrations from the ordinary type or appearance of a species for which some general cause may be assigned.*

A bright, light, and open situation, particularly at considerable elevations above the sea, or at high latitudes, without too much wet or drought, tends to increase the size and heighten the colour of flowers, in proportion to the stature and foliage of the plant.

Shade, on the contrary, especially if accompanied by richness of soil and sufficient moisture, tends to increase the foliage and draw up the stem, but to diminish the number, size, and colour of the flowers.

A hot climate and dry situation tend to increase the leaves, prickles, and other productions of the epidermis, to shorten and stiffen the branches, rendering thorny plants yet more spinous. Moisture in a rich soil has a contrary effect.

The neighbourhood of the sea, or a saline soil or atmosphere, imparts a thicker and more succulent consistence to the foliage and almost every part of the plant, and appears not unfrequently to enable plants usually annual to live through the winter. Flowers in a maritime variety are often much fewer, but not smaller.

The luxuriance of plants growing in a rich soil, and the dwarf stunted character of those crowded in poor soils, are too well known to need particularizing. It is also apparent as we advance into the cold damp regions of the summits of high mountain ranges, or into high northern latitudes; and yet it is frequently from the want of attention to these circumstances that numbers of false species have been added to our Enumerations and Floras. Luxuriance entails not only increase of size to the whole plant, or of particular parts, but increase of number in branches, in leaves, or blades of a compound leaf; or it may diminish the hairiness of the plant, induce thorns to grow out into branches, etc.

Capsules which, while growing, lie close upon the ground, will often become larger, more succulent, and less readily deliquescent, than those which are not so exposed to the moisture of the soil.

Herbs eaten down by sheep or cattle, or crushed underfoot, or otherwise checked in their growth, or trees or shrubs cut down to the ground, if then exposed to favourable circumstances of soil and climate, will send up luxuriant side-shoots, often so different in the form of their leaves, in their ramification and inflorescence, as to be scarcely recognizable for the same species.

Annuals which have germinated in spring, and flowered without check, will often be very different in aspect from individuals of the same species, which, having germinated later, are stopped by summer droughts or the approach of winter, and only flower the following season upon a second growth. The latter have often been mistaken for perennials.

Hybrids, or crosses between two distinct species, come under the same category of anomalous specimens from a known cause. Frequent as they are in gardens, where they are artificially produced, they are probably rare in nature, although on this subject there is much diversity of opinion, some believing them to be very frequent, others almost denying their existence. Absolute proof of the origin of a plant found wild, is of course impossible; but it is pretty generally agreed that the following particulars must always co-exist in a *wild hybrid*. It partakes of the characters of its two parents; it is to be found isolated, or almost isolated, in places where the two parents are abundant; if there are two or three, they will generally be dissimilar from each other, one partaking more of one parent, another of the other; it seldom ripens good seed; it will never be found where one of the parents grows alone.

Where two supposed species grow together, intermixed with numerous intermediates bearing good seed, and passing more or less gradually from the one to the other, it may generally be concluded that the whole are mere varieties of one species. The beginner, however, must be very cautious not to set down a specimen as intermediate between two species, because it appears to be so in some, even the most striking characters, such as stature and foliage. Extreme varieties of one species are connected together by transitions in all their characters, but these transitions are not all observable in the same specimens. The observation of a single intermediate is therefore of little value, unless it be one link in a long series of intermediate forms, and, when met with, should lead to the search for the other connecting links.

2. *Accidental aberrations from the ordinary type, that is, those of which the cause is unknown.*

These require the more attention, as they may sometimes lead the beginner far astray in his search for the genus, whilst the aberrations above-mentioned as reducible more or less to general laws, affect chiefly the distinction of species.

Almost all species with coloured flowers are liable to occur occasionally with them all white.

Many may be found even in a wild state with double flowers, that is, with a multiplication of petals.

Plants which have usually conspicuous petals will occasionally appear without any at all, either to the flowers produced at particular seasons, or to all the flowers of individual plants, or the petals may be reduced to narrow slips.

Flowers usually very irregular, may, on certain individuals, lose more or less of their irregularity, or appear in some very different shape. Spurs, for instance, may disappear, or be produced on all instead of one only of the petals.

One part may be occasionally added to, or subtracted from, the usual number of parts in each floral whorl, more especially in regular polypetalous flowers.

Plants usually monoecious or dioecious may become occasionally hermaphrodite, or hermaphrodite plants may produce occasionally uni-sexual flowers by the abortion of the stamens or of the pistils.

Leaves cut or divided where they are usually entire, variegated or spotted where they are usually of one colour, or the reverse, must also be classed amongst those accidental aberrations which the botanist must always be on his guard against mistaking for specific distinctions.

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FLORA AUSTRALIENSIS.

CLASS I. DICOTYLEDONS.

Stem, when perennial, consisting of a pith in the centre, of one or more concentric circles of woody tissue, and of the bark on the outside. Embryo with two cotyledons, the young stem in germination proceeding from between the two lobes of the embryo or from a notch at its summit.

The above characters are the most constant to separate *Dicotyledons* from *Monocotyledons*; these two great classes have, however, each a peculiar habit, which in most cases is easily recognized. All Australian trees and shrubs, except *Palms*, a few *Ferns*, and *Bamboos*, and a few others with linear grass-like leaves, are *Dicotyledons*; so also are almost all plants with opposite, or whorled, or netted-veined leaves, or with the parts of the flower in fours, fives, or eights, or with indefinite stamens, all these characters being very rare in *Monocotyledons*.

The following list of Orders contained in this first volume is intended to show the arrangement adopted. The characters given are not absolute, nor without exception, and are inserted for the purpose of calling attention to one or two of the most striking or most important features of each Order. In some cases, where an Order is represented in Australia only by some anomalous genus, its exceptional character is placed in a parenthesis. An analytical key to the Orders will be given at the close of the work.)

SUBCLASS I. POLYPETALÆ.

Petals several, distinct (wanting in a few genera, very rarely united).

SERIES I. THALAMIFLORE.—Torus small or elongated, rarely expanded in a disk. Ovary superior. Stamens definite or more frequently indefinite.

Alliance (Cohors) **I. Ranales.**—*Stamens indefinite, or if definite, opposite the petals. Carpels distinct or united at the base only, superior, or rarely enclosed in a fleshy torus. Embryo small, in a fleshy albumen.*

(Carpels united in *Eupomatia* and *Nymphaea*. Embryo large, without albumen in some *Menispermaceæ* and in *Nelumbium*.)

I. RANUNCULACEÆ. Herbs with radical or alternate leaves, or climbers with opposite leaves. No stipules. Sepals usually coloured and deciduous. Petals in a single series or none. Stamens indefinite. No arillus.

II. DILLENIACEÆ. Shrubs or undershrubs with alternate leaves. No stipules. Sepals usually herbaceous and persistent. Petals in a single series. Stamens usually indefinite. Seeds with an arillus or strophiole.

III. MAGNOLIACEÆ. Shrubs or trees, with alternate leaves. Petals indefinite. Stamens indefinite. No arillus. (Calyx entire in the bud, irregularly split.)

IV. ANONACEÆ. Shrubs, trees, or woody climbers, with alternate leaves. No stipules. Sepals 3. Petals in 2 series of 3 each (excepting *Eupomatia*, where sepals and petals are combined in a mass). Stamens indefinite. Carpels indefinite. Albumen rudinate.

V. MENISPERMACEÆ. Twiners, with alternate leaves. No stipules. Flowers small, dioecious. Sepals in 2 or more series of 3 or 2 each. Petals smaller than the inner sepals, or none. Stamens definite, opposite the petals. Carpels 6 or fewer.

VI. NYMPHÆACEÆ. Aquatic herbs. Leaves usually peltate. Sepals or petals indefinite, or rarely in threes. Stamens indefinite. Carpels free or united, the ovules not in the inner angle.

Alliance II. Parietales.—*Stamens definite or indefinite. Ovary syncarpous, with 2 or more parietal placentas, either 1-celled, or incompletely divided by the placentas protruding in the cavity, or divided by false dissepiments connecting the placentas. Ovules usually several to each placenta, rarely solitary.*

VII. PAPAVERACEÆ. Herbs, with alternate leaves. No stipules. Sepals 2. Petals 4. Flowers regular, with indefinite stamens, or irregular, with diadelphous definite stamens. Albumen copious. Embryo small.

VIII. CRUCIFERÆ. Herbs, with alternate leaves. No stipules. Sepals 4. Petals 4. Stamens 6, tetradynamous or rarely 4. Placentas 2, connected by a false dissepiment. No albumen. Embryo curved.

IX. CAPPARIDACEÆ. Herbs, shrubs, or trees. Stipules often prickly. Sepals 4 (2 outer ones sometimes united). Petals 4 (rarely more, or none, or united). Stamens indefinite, or if few, not tetradynamous. Placentas 2 or more. No albumen. Embryo curved.

X. VIOLARIACEÆ. Herbs or shrubs. Stipules herbaceous or small. Sepals 5. Petals 5 (often irregular). Anthers 5, on short filaments, connivent or connected in a ring round the pistil. Placentas usually 3. Albumen fleshy. Embryo rather large.

XI. BINNÉÆ. Trees or shrubs. Stipules none. Sepals 5 or fewer. Petals various, often none. Stamens indefinite. Placentas 2, 3, or more meeting in the axis in *Cochlospermum*). Albumen fleshy. Embryo rather large.

Alliance III. Polygalinere.—*Sepals and petals 5 each, rarely fewer. Stamens the same number or twice as many, or fewer, but the filaments are irregular. Ovary usually 2-merous (although in most genera essentially 3-5-merous), partially or completely divided into as many cells. Ovules indefinite, or solitary with a superior micropyle. Albumen fleshy.*

XII. PITIOSPOREÆ. Trees, shrubs, undershrubs, or twiners, with alternate leaves. No stipules. Flowers regular or oblique. Stamens as many as petals. Embryo minute.

XIII. TRIMANDRÆÆ. Shrubs often heath-like, with alternate or whorled or opposite leaves. No stipules. Flowers regular. Stamens twice as many as petals. Embryo small or minute.

XIV. POLYGALICEÆ. Herbs, undershrubs, or shrubs, with alternate leaves. No stipules. Flowers irregular. Stamens monadelphous. Embryo rather large, sometimes almost or quite without albumen.

Alliance IV. Caryophyllinæ.—*Sepals or calyx-lobes 5 or fewer. Petals 5 or fewer. Stamens as many or twice as many, or indefinite. Ovary 1-celled, with central placentas (except Frankeniæ). Albumen mealy. Embryo curved, or rarely straight when the albumen is scanty.*

(Ovary half-inferior in *Portulaca*.)

XV. FRANKENIACEÆ. Small or prostrate undershrubs, or herbs, with small opposite leaves. No stipules. Calyx angular, toothed. Petals isomerous with the calyx. Stamens definite. Placentas parietal.

XVI. CARYOPHYLLICEÆ. Herbs, rarely undershrubs, with opposite entire leaves. Stipules none or scarious. Calyx toothed or sepals free. Petals isomerous with the calyx. Stamens definite. Placentas central.

XVII. PORTULACÆE. Herbs, often succulent, with alternate or opposite leaves. Stipules scarious or changed into hairs. Sepals 2. Petals more numerous than the sepals. Stamens indefinite or rarely definite. Placentas central.

Alliance V. Guttiferales.—*Sepals imbricate. Petals as many as sepals, or rarely more. Stamens indefinite (except Elatinææ). Ovary divided into cells, with axile placentas.*

XVIII. ELATINÆE. Herbs or undershrubs, with small opposite leaves. Stipules small. Flowers hermaphrodite. Stamens definite.

XIX. HYPERICINÆE. Herbs or shrubs, with opposite leaves. No stipules. Flowers hermaphrodite. Stamens indefinite.

XX. GUTTIFERÆ. Trees or shrubs, with opposite leaves. No stipules. Flowers polygamous or unisexual. Stamens indefinite.

Alliance VI. Malvales.—*Sepals valvate (except Echinocarpus). Petals as many as sepals, or none. Stamens indefinite or monadelphous (except Lasiopetalææ). Ovary divided into cells with axile placentas.*

XXI. MALVACÆE. Herbs, shrubs, or trees, with alternate leaves. Stipules usually present. Stamens monadelphous. Anthers 1-celled.

XXII. STERCULIACÆE. Herbs, shrubs, or trees, with alternate leaves. Stipules usually present. Stamens monadelphous, or, if free, definite and alternating with the petals. Anthers 2-celled.

XXIII. TILIACÆE. Trees or shrubs, rarely herbs, with alternate leaves. Stipules usually present. Stamens indefinite, free, or scarcely united at the base. Anthers 2-celled.

SERIES II. DISCIFLORÆ.—*Torus usually thickened or expanded into a disk, either free or adnate to the ovary, or to the calyx, or to both, rarely reduced to glands, or wanting. Stamens as many or twice as many as petals, or fewer. Ovary superior, or partially immersed in the disk, divided into cells with axile placentas, or the carpels distinct.*

(Stamens indefinite in a very few exceptional species. Ovary inferior or enclosed in the calyx-tube in most *Rhamnææ*; 1-celled in some *Oleaceææ*.)

Alliance VII. Geraniales.—*Disk within the stamens, or confluent with the staminal tube, or reduced to glands, or obsolete. Gynæcium lobed or apocarpous, or sometimes entire. Ovules usually 1 or 2 in each cell, 1 or both pendulous with a ventral raphe.*

XXIV. LINÆE. Herbs or shrubs, with undivided alternate leaves. Stipules often present. Disk small, glandular, or none. Ovary entire. Ovules usually 2 in each cell. Albumen fleshy, rarely wanting.

XXV. MALPIGHIACÆE. Woody climbers (rarely trees or shrubs), with opposite (rarely alternate) leaves. Stipules present. Two glands on the outside of some or all the calyx-lobes (wanting in the Australian genera). Disk not large. Gynæcium lobed or apocarpous. Ovules solitary in each cell. No albumen.

XXVI. ZYGOPHYLLÆE. Herbs or shrubs, usually articulate or succulent, without glandular dots. Leaves 2-foliate or pinnate, rarely simple. Stipules present. Disk fleshy. Ovary angular or lobed. Ovules 2 or more in each cell. Albumen fleshy or none.

XXVII. GERANIACÆE. Herbs or shrubs, articulate or not, with toothed, divided, or compound leaves without glandular dots. Stipules usually present. Disk reduced to 3 glands or obsolete. Ovary angular or lobed. Ovules 1, 2, or rarely more in each cell. Albumen none or rarely fleshy.

XXVIII. RUTACÆE. Trees or shrubs, very rarely herbs, with compound or rarely simple leaves, always marked with pellucid glandular dots. No stipules. Disk within the stamens. Ovary rarely entire, usually lobed or the carpels distinct, with the styles connate or gynæcium entirely apocarpous. Ovules 2 in each cell. Albumen fleshy or none.

XXIX. SIMARUBÆ. Characters of *Rutaceæ*, except that the leaves are not dotted and the ovules are usually solitary in each cell. Taste generally bitter.

XXX. BURSERACEÆ. Trees or shrubs, not dotted, but with a balsamic juice. Leaves pinnately or ternately compound. No stipules. Disk free or adnate to the calyx-tube. Ovary entire. Ovules usually 2 in each cell. Albumen none. Cotyledons much folded or rarely thick and fleshy.

XXXI. MELIACEÆ. Trees or shrubs, with compound or rarely simple leaves. No stipules. Stamens monadelphous. Anthers sessile or rarely stipitate within or on the top of the staminal tube. Ovary entire. Ovules 2 in each cell. Albumen none or fleshy.

Alliance VIII. Olacales.—*Disk various or none. Ovary entire. Ovules 1 to 3 in a solitary cell, or 1 in each cell, pendulous with a dorsal raphe, the integuments not distinct from the nucleus. Seeds solitary in the fruit or in the cells. Albumen copious.*

XXXII. OLACINÆ. Trees or shrubs, rarely undershrubs or climbers. No stipules. Petals or corolla-lobes valvate (except *Villaresia*). Ovary 1-celled or incompletely 3- to 5-celled. Fruit 1-seeded.

XXXIII. ILICINÆ. Trees or shrubs. No stipules. Petals or corolla-lobes imbricate. Ovary 3- or more celled.

Alliance IX. Celastrales.—*Disk thick and fleshy or adnate to the calyx, the stamens outside or upon it. Ovary entire (except Stackhousia). Ovules 1 or 2 in each cell, erect with a ventral raphe.*

XXXIV. CELASTRINÆ. Trees or shrubs, with simple leaves. Stipules none, or minute and deciduous. Calyx-lobes imbricate. Petals spreading. Stamens alternating with the petals or fewer. Ovary entire.

XXXV. STACKHOUSIÆ. Herbs or undershrubs, with simple leaves. Calyx-lobes imbricate. Petals erect, usually connate. Stamens alternating with the petals. Ovary lobed.

XXXVI. RHAMNÆ. Trees or shrubs, with simple leaves. Stipules usually present. Calyx-lobes valvate. Petals small, concave (or none). Stamens opposite the petals. Ovary entire, often inferior.

XXXVII. AMPELIDÆ. Climbers, with simple or compound leaves, the petiole usually expanded into a stipule. Calyx-lobes imbricate. Petals valvate. Stamens opposite the petals. Ovary entire. Albumen cartilaginous. Embryo small.

Alliance X. Sapindales.—*Disk fleshy or adnate to the calyx, within or under or outside the stamens. Gynæcium entire, lobed or apocarpous. Ovules 1 or 2 in each cell, ascending with a ventral raphe, or reversed, or suspended from an erect funiculus, or pendulous with an inferior micropyle.*

XXXVIII. SAPINDACEÆ. Trees, shrubs, or climbers, with compound or simple leaves. Stamens anisomerous with the petals, or twice as many as petals or of the same number, often (but not always) within the disk. Style 1. Ovules ascending.

XXXIX. ANACARDIACEÆ. Trees or shrubs, with compound or simple leaves. Stamens as many or twice as many as petals, never within the disk. Ovules suspended from an erect funicle or from the top or side of the cell with an inferior micropyle.

ORDER I. RANUNCULACEÆ.

Sepals 3 or more, most frequently 5, usually petal-like and deciduous. Petals of the same number or more, or sometimes none, or very small and deformed. Stamens indefinite, hypogynous, free. Anthers innate. Gynæcium of several carpels, usually free; ovules anatropous, either solitary and ascending, with a ventral raphe, or pendulous with a dorsal raphe, or several. Fruit of one or more indehiscent achenes or berries, or follicular capsules, the distinct styles usually persistent as short points, or lengthened into long.



often bearded tails. Seeds without any arillus. Embryo very small, near the base of a copious albumen.—Herbs either annual or with a perennial rootstock, or creeping stolons, with radical or alternate leaves, or climbers with opposite leaves. Leaves entire, or palmately or pinnately lobed or divided, the petiole often dilated and sheathing at the base, or rarely accompanied by stipular appendages. Hairs, when present, simple. Flowers regular (or in a few genera, not Australian, irregular), terminal or leaf-opposed, rarely axillary, solitary paniculate or racemose.

The Order is chiefly numerous in the temperate regions of the northern hemisphere, rare within the tropics, and not represented by many species in the southern hemisphere. The Australian ones are all extratropical, and belong to genera more numerous represented in the north.

TRIBE I. **Clematideæ**.—*Sepals valvate. Carpels indehiscent, with 1 pendulous ovule or seed in each. Stems often climbing. Leaves opposite.*

Petals none 1. CLEMATIS.

TRIBE II. **Anemoneæ**.—*Sepals imbricate. Carpels indehiscent, with 1 pendulous ovule or seed in each. Herbs. Leaves radical or alternate or forming an involucre below the flower.*

Petals none. Involucre below the flower. Achenes in a short head . . . 2. ANEMONE.

Petals minute, narrow. No involucre. Achenes very numerous, in a long, close, slender spike 3. MYOSURUS.

TRIBE III. **Ranunculeæ**.—*Sepals imbricate. Carpels indehiscent, with 1 ascending ovule or seed in each. Herbs. Leaves radical or alternate.*

Sepals deciduous. Petals 3, 5, or more 4. RANUNCULUS.

TRIBE IV. **Helleboreæ**.—*Sepals imbricate. Carpels usually opening along the inner edge, containing several ovules or seeds. Herbs. Leaves radical or alternate.*

Petals none 5. CALTHA.

1. CLEMATIS, Linn.

Sepals 4, or rarely 5 to 8, petal-like, valvate in the bud. Petals none, or smaller than the sepals, and passing gradually into the stamens. Carpels many, with one pendulous ovule in each. Achenes capitate, sessile, or scarcely stipitate, terminating in a plumose or simple tail, formed by the persistent and enlarged style.—Stem woody and climbing, or rarely dwarf or prostrate. Leaves opposite, pinnately or ternately divided into three or more petiolulate segments, or rarely simple, the petiole often twisted or twining. Flowers axillary or terminal, solitary, or in panicles, which are shortened branches with the leaves reduced to small bracts, and often polygamous or dioecious.

A large genus, dispersed over the temperate regions both of the New and the Old World, rare within the tropics. The Australian species are all endemic, although one is closely connected with a South Pacific one. They have all simple or once- or twice-ternately divided leaves, dioecious, apetalous, white or cream-coloured flowers, the males usually without any ovaries, the females with a few imperfect stamens, and the carpels of all have plumose tails.

Anthers linear or oblong, tipped by a subulate or oblong appendage.

Woody climbers. Leaflets mostly once or twice ternate.

Anther-points slender. Leaflets almost coriaceous, when large usually toothed, when small twice ternate 1. *C. aristata*.

Anther-points very short. Leaflets usually 3, rather large, thin, and entire 3. *C. glycinoides*.

ments, large, ovate-lanceolate or lanceolate, and firm. Flowers large, usually glabrous, solitary, or few in loose clusters. Anther-appendages short. Achenes villous, narrow.—Deless. Ic. Sel. i. t. 5; Hook. f. Fl. Tasm. i. t. 3.

Tasmania. Not so common as *C. aristata*, but found in various parts of the colony, always in poor soil, *J. D. Hooker*.

3. ***C. glycinoides*, DC. Syst. Veg. i. 145.** A woody climber, very near to those forms of *C. aristata* which have simply ternate rather large ovate-lanceolate or cordate leaflets, but these leaflets are usually of a thinner consistence, often broader, and quite entire or rarely with a single tooth near the base. Flowers usually smaller, the sepals narrow, from $\frac{1}{2}$ to $\frac{3}{4}$ in., pubescent or rarely glabrous. Anthers rather shorter, with a very short obtuse and almost gland-like appendage. Achenes glabrous or pubescent, usually narrower than in *C. aristata*, with tails of about 2 in.—*C. stenosepala*, DC. Syst. Veg. i. 147.

Queensland. Keppel Bay, *R. Brown* (a form with 3 large broad segments).

N. S. Wales. Port Jackson and Port Macquarie, *R. Brown* and others; Lord Howe Island. From the latter station we have a small specimen, gathered by *Macleay*, with the foliage of *Brown's* specimen from Keppel Bay. Another female specimen, gathered in Lord Howe Island by *McGillivray*, who states it to be very abundant there, has several of the leaves large, simple, and orbicular-cordate, with 7 to 9 nerves. This connects it very closely with *C. concinifolia*, A. Gunn. in Ann. Nat. Hist. ser. 1. iv. 260, from Norfolk Island, which has most of the leaves simple and orbicular, and with *C. Pickeringii*, A. Gray, in Bot. Amer. Expl. Exped. i. 1, from the Fiji Islands, which has three large leaflets. All these plants have similar floral characters, and may now safely prove to be varieties of one species.

Var. *subnatica*. Leaf-segments loosely pubescent underneath, sepals shorter, broader, and more villous than in the other forms, anthers short, tipped by a minute gland or entirely without appendage, as in *C. microphylla*.—Clarence river and Brisbane river, *Herb. F. Mueller*, upon whose authority I insert it as a variety of *C. glycinoides*, the specimens being as yet insufficient to determine whether it may not really be a distinct species.

4. ***C. microphylla*, DC. Syst. Veg. i. 147.** A tall woody climber, with the habit of the smaller-leaved varieties of *C. aristata*. Leaflets mostly twice ternate, narrow, from ovate-lanceolate or oblong to nearly linear, $\frac{1}{2}$ to 1 in. long, but sometimes simply ternate and larger and broader, or three times ternate and much smaller. Flowers rather smaller than in *C. aristata*, usually numerous in short panicles. Sepals cream-coloured, from oblong-lanceolate to narrow-linear, mostly about $\frac{1}{2}$ in. rarely near 1 in. long, glabrous or pubescent. Stamens with unequal filaments as in *C. aristata*, but the anthers are always very shortly oblong or ovate and very obtuse, without any terminal appendage. Achenes of *C. aristata*, but usually with thicker, often wrinkled or warty margins and longer tails.—*F. Muell. Pl. Vict. i. 4; C. linearifolia*, Steud.; Hook. f. Fl. Tasm. i. 4, t. 1; *C. stenophylla*, Fras.; Hook. in Mitch. Trop. Aust. 368.

Queensland. On the Maranoa, *Mitchell*; Moreton Bay, *Herb. F. Mueller*.

N. S. Wales. Frequent in the western interior, *A. Cunningham*, *Fraser*, and others.

Victoria. South coast, *R. Brown*; not rare along the coast and on the banks of rivers near the sea, much less frequent inland, *F. Mueller*.

Tasmania. Sandhills, George Town and Flinders Island, *Gunn*.

S. Australia. Banks of the Torrens, *Whiteaker*, and other points along the coast, *F. Mueller*.

W. Australia. King George's Sound, *Collie*; Swan River, *Drummond*; *Preiss*, n. 1343.

Var. *occidentalis*. Carpels narrower and seldom wrinkled, with tails often of 3 to 4 inches. Sepals usually long and narrow. —*C. linearifolia*, Steud. in Pl. Preiss. ii. 262. Apparently the usual form in West Australia.

Var. *leptophylla*, F. Muell. Leaf-segments very small and narrow. Trailing over granite rocks on the Snowy River and Mitta Mitta, *F. Mueller*.

2. **ANEMONE**, Linn.

Involucre of 3 or more leaves or lobes either close to the flower or on the peduncle below it. Sepals 4 to 20, petal-like. Petals none. Carpels indefinite, with 1 pendulous ovule in each. Achenes in a globular or oblong head, glabrous or woolly, pointed by the persistent style, which is sometimes lengthened into a bearded tail.—Herbs, with a perennial rootstock. Leaves radical, cut or lobed. Scapes radical, leafless except the involucre. Flowers terminal, variously coloured, but not bright yellow. Stamens shorter than the sepals.

A large genus, chiefly dispersed over the temperate or mountainous regions of the northern hemisphere. A few species are found in South America and southern Africa, but they are further removed even than some of the northern ones from the Australian one, which is strictly endemic.

1. **A. crassifolia**, *Hook. Ic. Pl. t.* 257. Radical leaves on rather long petioles; segments 3, distinct but sessile, obovate or almost orbicular, from $\frac{1}{2}$ to $\frac{3}{4}$ in. long or rarely 1 inch, more or less deeply divided into 3 or more broad obtuse lobes, thick and almost succulent or coriaceous, glabrous or sprinkled with rigid appressed hairs. Scape 6 to 8 in. high, clothed with appressed hairs, especially in the upper part. Involucre rather above the middle, irregularly divided into 2 or 3 sessile lobed segments. Sepals usually 6 or 7, white, ovate or obovate, $\frac{1}{2}$ to $\frac{3}{4}$ in. long. Achenes in a globular head, glabrous, rather inflated, terminating in a glabrous point about two lines long, hooked at the extremity.—*Hook. f. Fl. Tasm.* i. 4.

Tasmania. Mountains of the Black Bluff range and west of Cape St. Clair, at an elevation of 4000 to 5000 feet, *Gunn, Milligan*.

3. **MYOSURUS**, Linn.

Sepals usually 5, produced below their insertion into a small spur. Petals 5, small and very narrow, almost tubular at the top, often wanting. Carpels numerous, with one pendulous ovule in each. Achenes closely packed in a long slender spike, flat on the back, or with a raised nerve ending in the short persistent style.—Small annuals with linear radical entire leaves. Flowers very small, on leafless scapes.

A genus comprising, besides the following, only one other species, *M. aristatus*, Geyer, distinguished by the more prominent and spreading points of the achenes, which although originally described from North America and from Chili, has also been found in New Zealand, and may not improbably appear in Australia.

1. **M. minimus**, *Linn.; DC. Prod.* i. 25. Leaves sometimes not an inch long, sometimes attaining 2 or even 3 inches, including their long petiole. Scapes shorter or longer than the leaves. Sepals yellowish or pale green, very small; petals rarely longer than the calyx, and in the Australian



specimens often deficient. Stamens usually 4 or 5, and seldom above 10. Achenes sometimes near 300, the head lengthening into a spike of 1 to 2 inches, which has been compared to a mouse's tail.—*F. Muell. Pl. Viet. i. 4*; *A. Gray, Gen. Ill. t. 8*; *M. australis*, *P. Muell. in Trans. Phil. Soc. Viet. i. 6*.

Victoria. Moist places near permanent waters, or open places where rain-water lodges from time to time. *P. Muell.*

The species is widely spread over Europe, temperate Asia, northern and western America, and may possibly have been introduced into Australia.

4. RANUNCULUS, Linn.

Sepals usually 5, deciduous. Petals as many or more, usually marked with a small nectariferous pit, or a minute scale near the base. Carpels several, with a single ascending ovule in each. Achenes in a globular or ovoid head or oblong spike, tipped or beaked by the persistent hooked or straight style.—Herbs either annual or with a perennial root-stock, and tufted entire or variously cut radical leaves. Flowering stems either a leafless scape, or several-flowered, bearing few leaves and chiefly at the base of the peduncles. Flowers yellow, white, or red.

A large genus abounding in the temperate and colder regions of both the northern and southern hemispheres, but more especially in the former, and almost confined in the tropics to the higher mountain ranges. The Australian species have no peculiar character, but belong to the three principal sections of the genus, and two at least are specifically identical with widely-spread northern species.

SECT. 1. Batrachium.—Carpels transversely wrinkled. Water-plants with their leaves when submerged finely divided into segments. Flowers white. 1. *R. aquatilis*.

SECT. 2. Hecatonia.—Carpels smooth. Perennials (in Australia) with a tufted root-stock, or creeping or floating stolons. Flowers white or yellow.

Radical leaves pinnate, with narrow-linear, entire or divided, rather distant segments.

Rootstock a cluster of short thick fibres. Stems mostly 2-flowered, longer than the leaves. (Fl. yellow?)

2. *R. Robertsoni*.

Rootstock tufted with long fibres. Scapes 1-flowered, shorter than the leaves. Fl. white.

3. *R. Millani*.

Radical leaves orbicular, with numerous overlapping lobes. Stem-leaves similar but sessile. Flowers large, white

4. *R. anemoneus*.

Radical leaves with numerous narrow-linear segments, pinnate but crowded at the top of the petiole. Flowers yellow.

Carpels numerous, tapering into a beak either straight or slightly hooked. Petals narrow, often more than 6.

5. *R. Gunnianus*.

Sepals from $\frac{2}{3}$ to nearly as long as the petals

6. *R. dissectifolia*.

Sepals not half so long as the petals

Carpels with a much recurved point. Leaf-segments less crowded. Petals usually 5, obovate

7. *R. lappaceus*, var.

Radical leaves pinnate, with flat segments or digitate. Flowers yellow. Stems tufted or erect or decumbent, without stolons. Petals usually 5.

Calyx appressed or spreading, not reflexed.

Carpels with a much recurved point. Plant hispid, or silky hairy, or nearly glabrous. Leaves pinnatisect, or 3- to 5-lobed, or entire

7. *R. lappaceus*.

Carpels numerous, tapering into a straight or slightly hooked beak. Leaves thick, entire or 3-lobed, silky underneath, with long tubercular hairs above

8. *R. Muellieri*.

- Calyx reflexed. Stem weak, hirsute. Leaves not pinnate.
 Flowers small 9. *R. plebeius*.
 Stems creeping, floating, or stoloniferous. Plant glabrous or nearly
 so. Leaves digitate. Petals usually 6 to 10 10. *R. rivularis*.

SECT. 3. **Echinella**. — *Carpels tuberculate or muricate or hispid on the sides*.
Annuals. Flowers yellow.

Flowers lateral, sessile, or on peduncles shorter than the leaves.

- Hairy plant, with very small flowers, often sessile. Carpels usually
 about 1 line long, with a small recurved point 11. *R. parviflorus*.
 Glabrous plant. Flowers all pedunculate. Carpels much muricate,
 2 lines long or more, with a stout beak *R. muricatus*. (p. 15.)
 Flowers terminal, pedunculate *R. philonotis*. (p. 15.)

1. ***R. aquatilis***, Linn.; DC. *Prod.* i. 26. A most variable species, easily known by its stem either floating in water or creeping in half-dried mud, by its white flowers and very small ovoid carpels marked with transverse wrinkles. It is always glabrous, excepting sometimes the carpels and their receptacle. In the Australian specimens the leaves are all submerged and divided into numerous very fine linear segments; in northern ones, there are frequently also a few upper leaves spreading on the surface of the water, which are rounded and more or less cut into 3 or 5 wedge-shaped, obovate, or rounded lobes. Peduncles axillary and 1-flowered. Petals 5 or sometimes more, white, without any scale or spot at the base; in most Australian specimens they are scarcely longer than the calyx, and the stamens are very few, but sometimes the petals are fully twice as long, and the stamens numerous. —Hook. f. *Fl. Tasm.* i. 5.; F. Muell. *Pl. Vict.* i. 5.

Victoria. Bacchus Marsh, Murray river, Mitta-Mitta river, etc., F. Mueller.

Tasmania. Lake river, near Grindelwald and Formosa, Gunn; South Esk river and near Eyndale, C. Stuart.

S. Australia. Near Adelaide, on the Lower Murray river, etc., Behr, F. Mueller.

The species is abundant in the waters of the northern hemisphere.

2. ***R. Robertsoni***, Benth. Allied to *R. Millani*, but distinguished from all Australian species, and in some measure connected with some of the European ones by its rootstock consisting of a cluster of short thick fibres. Radical leaves usually 2 or 3 in. long, pinnately divided in their upper portion into a few rather distant narrow linear segments, which are often again divided into 2 to 5 lobes, not unlike those of *R. Millani*, glabrous or with a few silky appressed hairs. Flower-stems often 2-flowered, 3 to 8 in. high, with 1 or 2 narrow and not much cut leaves. Flowers rather large, appearing yellowish in the dried specimens, but possibly white. Sepals not half so long as the petals. Petals 5, obovate, with a small glandular pit. Achenes in an ovoid head on a slender glabrous receptacle, glabrous and smooth, tapering into a long and slightly hooked beak.

Victoria. Forest land near the Glenelg, and in Nangela Vale, Robertson.

3. ***R. Millani***, F. Muell. in Hook. *Kew Journ.* vii. 358, and *Pl. Vict.* i. 6. A dwarf tufted perennial, with long clustered fibres, occasionally emitting a short stolon terminating in another tuft. Leaves all radical, 1 to 2 in. long, pinnately divided in their upper portion into a few narrow-linear segments either entire or again divided, most of them terminating in a small gland, glabrous or hispid, with a few long hairs. Scapes 1-flowered, leafless,

shorter than the leaves and often very short. Flowers white, although sometimes appearing yellowish when dry. Sepals not above half as long as the petals. Petals 5 to 10, obovate or oblong-cuneate, the glandular pit very small. Achenes in a globular head with a short recurved style; receptacle hairy, very short.

Victoria. Gravelly places on most of the summits of the Australian Alps, *F. Mueller*.

4. **R. anemoneus**, *F. Muell. in Trans. Phil. Soc. Vict.* i. 97, and *Pl. Vict.* i. 7. *t.* 1. A rather stout perennial, hirsute with long soft hairs, or glabrous. Rootstock thick, with long clustered fibres, and bearing several broad thin scales at the base of the leaves and stems. Radical leaves on long petioles of 5 to 10 in., nearly orbicular, 2 to 4 in. diameter, deeply divided into 3 or 5 segments, which are again digitately cut and lobed, the segments overlapping each other so as to make the leaf appear peltate, the ultimate lobes short and lanceolate. Stem 9 in. to 1 ft. high, 1- to 3-flowered, with a sessile, deeply-lobed, nearly orbicular leaf at the base of each peduncle. Flowers large and white. Sepals 5 to 7, rarely more than half the length of the petals. Petals usually numerous, oblong-cuneate, often $\frac{3}{4}$ in. long, the glandular pit rather large. Carpels numerous, in a globular head, tapering into a straight or scarcely hooked beak.

Victoria. Along springs near the summits of the Munyang mountains, *F. Mueller*. A very distinct species, allied in some respects to *R. nivicola*, from New Zealand, but readily known by the sessile stem-leaves.

5. **R. Gunnianus**, *Hook. Journ. Bot.* i. 244. *t.* 133. Rootstock thick, sometimes horizontal or shortly creeping, with long fibres. Leaves all radical and glabrous, or with a few long hairs, the petioles varying from 2 to 6 in., pinnately divided at the top into crowded linear or linear-lanceolate segments, most of them again once or twice divided, all thicker and firmer than in *R. Millani*, mostly tipped by a small gland. Scapes leafless and 1-flowered, usually longer than the leaves, silky hairy, at least at the summit. Flowers rather large, yellow, but often, especially the sepals, purple outside. Sepals nearly as long as the petals, glabrous. Petals 5, 6, or rarely more, cuneate-oblong, 6 to 9 lines long, usually with three glandular pits, the central one rather longer than the other, but sometimes only 1 and occasionally 5 pits to each petal. Carpels numerous, in a globular head, with a conical triquetrous or flattened beak, not hooked at the point.—*Hook. f. Fl. Tasm.* i. 5; *F. Muell. Pl. Vict.* i. 9.

Victoria. Grassy places throughout the greater portion of the Australian Alps at an elevation of from 4500 to 7000 ft., *F. Mueller*.

Tasmania. Hampshire hills, Western mountains, Ben Lomond, and as far north as Mount Lapeyrouse, etc., at about 4000 ft. elevation, *Lawrence, Gunn*.

The large loose grains of the albumen mentioned by Hooker, do not appear to be in their normal state; for I find the albumen of apparently quite ripe seeds, dense and fleshy as in other *Ranunculi*.

6. **R. dissectifolius**, *F. Muell. Herb.* Considered by *F. Mueller* as a variety of *R. lappaceus*, but it appears to me to be more nearly allied to *R. Gunnianus*, and although intermediate, as it were, between the two species, yet separated from both by characters not to be neglected. Leaves divided into numerous linear lobes and segments, crowded at the top of the petiole,

and often tipped with a gland, especially when very narrow, and achenes numerous, with straight or scarcely hooked beaks, as in *R. Gunnianus*. Hairs usually copious and spreading, and sepals not half so long as the petals, as in *R. lappaceus*. Scapes usually 1-flowered and leafless, or with a single leaf. Petals more than 5, usually 8 to 10, narrow, the glandular pit usually very faint and sometimes quite imperceptible.

Victoria. Wet alpine meadows of the Mungyang mountains, at an elevation of 5000 to 6000 ft., *F. Mueller*.

7. *R. lappaceus*, *Sm.*; *DC. Prodr.* i. 39. A perennial, more or less clothed with soft spreading or rarely silky and appressed hairs. Rootstock short, with long fibres and no stolons. Leaves chiefly radical, on long petioles, usually divided into 3 or 5 deep lobes or segments, ovate or rhomboid-cuneate, either pinnately distinct or, if confluent, almost palmate, although the middle lobe is generally longer than the lateral ones, each lobe or segment is often again lobed or toothed and sometimes much cut into narrow lobes, more rarely the leaves are all entire or shortly 3-lobed. Flowering stems either a leafless 1-flowered scape or branching and erect or decumbent, bearing several flowers and a few leaves, smaller and less divided than the radical ones. Flowers of a rich yellow. Sepals hairy or rarely glabrous, usually much shorter than the petals, appressed or open, but not closely reflexed. Petals usually 5, broadly obovate and rather large, with a small glandular pit near the base. Carpels in a globular head, compressed or rarely turgid, glabrous and smooth, with a recurved style, usually short, but longer and slender in some western specimens.—*Hook. f. Fl. Tasm.* i. 6; *F. Muell. Pl. Vict.* i. 7; *R. coloratum*, *Endl.* in *Hueg. Enum.* 1; *R. discolor*, *Steud.* in *Pl. Preiss.* i. 263 (calyx certainly not reflexed).

N. S. Wales. Port Jackson and in the interior, apparently common, *R. Brown* and others.

Victoria. Grassy places, from the lowlands to the limits of eternal snow; here and there also in boggy and swampy localities, *F. Mueller*.

Tasmania. Very common all over the island up to the highest summits, *J. D. Hooker, Gunn*.

S. Australia. In the pasture lands, *Behr*.

W. Australia. In sandy shady woods not far from the sea, *Preiss, n.* 1347. Blackwood river, *Oldfield*.

The following forms, all united by *F. Mueller* with *R. lappaceus*, and certainly appearing sometimes to pass into the common one by intermediate gradations, are nevertheless sufficiently well characterized to be considered at least as marked varieties:—

Var. *pimpinellifolius*. A small plant, with spreading hairs. Leaves all radical, distinctly pinnate, with usually 5 short, broad, 3- or 5-lobed segments. Scapes 1-flowered, leafless or with one small bract. Pit of the petals usually distant from the base. *R. pimpinellifolius*, *Hook. Journ. Bot.* i. 243, and *l.c. Pl. t.* 260. *R. hirtus*, *Hook. f. Fl. Tasm.* i. 6, but scarcely of Banks and Solander, which has the reflexed calyx and narrow petals of *R. plebeius*.—Australian Alps, *F. Mueller*. Tasmania, in moist places chiefly in the mountains, *Gunn*, including an alpine form, with much smaller petals.

Var. *scapigerus*. Very villous. Leaves all radical, short and broad, deeply 3- or 5-lobed, with obovate cuneate lobes, the middle one scarcely longer than the lateral ones. Scapes 1-flowered and leafless, or few-flowered with small leaves. Flowers small. Calyx almost reflexed.—*R. scapigerus*, *Hook. Journ. Bot.* i. 244; *Hook. f. Fl. Tasm.* i. 7.—Australian Alps, *F. Mueller*. Tasmania, mountains, *Gunn*. This form seems to pass almost into *R. plebeius* as to technical characters, but the habit is very different.

Var. *subsericeus*. Hairs all appressed and silky. Leaves usually narrow, entire, 3-lobed or pinnately divided into 3 or 5 entire segments. Scapes 1-flowered. Summits of the Australian Alps, *P. Mueller*. Tasmania, in the Hamphshire hills and Western Mountains, *Gunn*.

Var. *nanus*. Dwarf and nearly glabrous. Leaves all radical, usually 3-lobed or of 3 segments. Flowers small, on short scapes. —*R. nanus*, Hook. Journ. Bot. i. 242; Hook. f. Fl. Tasm. 1, 7; *R. cuneatus*, Hook. Journ. Bot. i. 242; Hook. f. Fl. Tasm. 1, 8.—Australian Alps, *P. Mueller*. Tasmania, alpine districts, summits of the Western Mountains, Arthur's Lakes, etc., *Gunn*.

8. **R. Muelleri**, *Benth.* Allied to *R. lappaceus*, var. *subsericeus*, but the achenes are too different to admit of its being united in the same species, at least until better known. Leaves all radical, undivided, entire or coarsely 3-toothed, oblong or cuneate, $\frac{1}{2}$ to 1 in. long, very thick, covered on the upper surface with long hairs proceeding from tubercles, and underneath with appressed short silky hairs. Scapes 1-flowered. Flowers nearly of *R. lappaceus*. Sepals very obtuse, not half so long as the petals. Petals 5, narrow-obovate. Achenes numerous, in a dense globular head, narrower than in *R. lappaceus*, and attenuated into a rigid, straight, or scarcely hooked point.

Victoria. Summits of the Munyang mountains, *P. Mueller*.

9. **R. plebeius**, *R. Br. in DC. Syst. Veg.* i. 288. Hirsute with spreading or rarely nearly appressed hairs. Radical leaves on long petioles, digitately divided into 3 deeply lobed and toothed cuneate or rhomboid segments. Stems weak, decumbent or erect, often above a foot long and branched, with a few leaves, the lower ones more divided than the radical ones, with the primary segments petiolate, the others smaller, more sessile, and less cut. Flowers several, small, on long peduncles. Calyx reflexed, shorter than the petals, very deciduous. Petals obovate or oblong, seldom above 2 lines long. Achenes few or numerous, more or less compressed, rather small, with a hooked or recurved slender style.—*Steud.* in *Pl. Preiss.* i. 263; *R. hirtus*, *Banks and Sol.* in *DC. Syst. Veg.* i. 289; *F. Muell. Pl. Viet.* i. 8.

N. S. Wales. Port Jackson, *R. Brown*, and northward to the Hastings river.

Victoria. Moe Swamp and Snowy River, Narracan river and Baw-baw mountains, *P. Mueller*.

W. Australia. In the interior, *Preiss, n.* 1348.

The New Zealand *R. hirtus*, *Banks and Sol.*, appears to be a slight variety of this species. A closely allied South African one has a rather different foliage, and the carpels often tuberculate or maricate, which never occurs in Australian specimens; it passes under the name of *R. pinnatus*, *Poir.*, which was originally given to an East Indian plant, very near to and perhaps identical with the Cape species, and that again almost passes into some European ones; but I do not think that any except the New Zealand *R. hirtus* can be absolutely identified with *R. plebeius*.

10. **R. rivularis**, *Banks and Sol. in DC. Syst. Veg.* i. 270. Stems creeping or stoloniferous, producing at every node tufts of radical leaves and erect scapes, or weak slightly branched flowering stems, rarely forming short thick rhizomes. Leaves on long petioles, digitately divided into 3, 5, or 7 segments, varying from cuneate to narrow-linear, rarely entire, usually 3-lobed, and sometimes much cut, but never pinnate, either quite glabrous, as well as the whole plant, or rarely with a very few appressed hairs. Flowers yellow,

usually small, the sepals not reflexed. Petals 6 to 10, about twice as long as the sepals, or 5 only in small-flowered varieties, narrow-oblong. Achenes rather small and broad, with a firm or slender recurved or rarely nearly straight point, not tubercled or muricate.—F. Muell. Pl. Viet. i. 8.

Queensland. Moreton Bay, *W. Hill*.

N. S. Wales. Abundant about Port Jackson, *Herb. Hooker*.

Victoria. In swamps, rivulets, marshes, or inundated places from the coast to the higher Alps, as well in brackish as in fresh water, *F. Mueller*.

Tasmania. Abundant in wet places, sometimes growing in deep water, *J. D. Hooker, Gunn*.

S. Australia. In swampy lands, *Dehr.*; extending to the Darling and St. Vincent's Gulf, but rare in the Colony, *F. Mueller*.

This very variable species is recognizable in perfect specimens by its creeping or floating stolons; where these are wanting, the glabrous digitate leaves and narrow petals are the best marks of distinction from the *R. lappaceus*. The following are the most marked forms it assumes.

Var. major. Tufts erect. Leaf-segments $\frac{1}{2}$ to 1 in. long or more, often very narrow and much cut, on petioles of 2 to 6 inches. Flowers rather large. *R. inundatus*, R. Br. in DC. Syst. Veg. i. 269. *R. glaberrimus*, Hook. Journ. Bot. i. 243; Hook. f. Pl. Tasm. i. 9. *R. incisus*, Hook. f. Fl. Nov. Zee. 1, 10, t. 4.

Var. subglauus. Very slender and creeping, or half floating in large masses, with small leaves, not much divided, and small flowers and achenes. *R. rivularis*, Banks and Sol. in DC. Syst. Veg. i. 270. *R. inundatus*, Hook. f. Pl. Tasm. i. 8.

Var. inconspicuus. Still smaller, with very small flowers.—*R. inconspicuus*, Hook. f. Pl. Tasm. i. 9, t. 2 B; Gunn, n. 1018, 1019.—An alpine form, which in the dried state might be confounded with some of the minute specimens of *R. lappaceus natus*.

The New Zealand specimens appear identical with the Australian ones. The nearest approach to it in other countries is the Antarctic-American *R. bitermatus*, Sm.; but that has biterminal petiolate leaf-segments, and thick broad, almost reniform achenes, very different from those of any Australian specimens I have seen. *R. acutis*, Banks, from New Zealand and from Auckland Islands, referred to *R. rivularis* by F. Mueller, comes certainly near to the var. *inconspicuus*, but appears to me to be distinct, although perhaps a reduced form of *R. bitermatus*. The New Zealand *R. macropus*, Hook., is also supposed by F. Mueller to be a variety of *R. rivularis*, but is too different in several points to be admitted without having seen connecting specimens.

11. **R. parviflorus**, Linn.; DC. Prod. i. 42: var. *australis*. A slender hairy annual, either with tufted erect stems of a few inches, or weak, procumbent, and lengthening to a foot or even more. Leaves small, orbicular, the lower ones often only 3- or 5-lobed, but mostly divided into three segments, either entire or 3-lobed, or again cut into narrow segments. Flowers small, leaf-opposed, sessile, or on short slender peduncles. Sepals rarely above 1 line long and very deciduous. Petals 5 or fewer, seldom much longer than the calyx. Achenes in a small globular head, much compressed, with a smooth margin, seldom much exceeding a line in breadth in Australian specimens, the sides covered with short hairs, or tubercles, or short hooked bristles, the style forming usually a very short recurved point, more rarely rigid and dilated at the base.—F. Muell. Pl. Viet. i. 9; *R. sessiliflorus*, R. Br. in DC. Syst. Veg. i. 302; Hook. f. Pl. Tasm. i. 9; *R. collinus*, R. Br. l. c. i. 271; *R. pumilio*, R. Br. l. c. i. 271; Hook. f. Pl. Tasm. i. 10; *R. leptocaulis*, Hook. Journ. Bot. i. 244; *R. pilulifer*, Hook. l. c. Pl. t. 600.

Queensland. In water-holes on the tops of the ranges in the interior, *Mitchell*.

N. S. Wales. Moist pastures and banks of rivers and lagoons, *R. Brown* and others.

Victoria. Common in similar stations, *F. Mueller*.

Tasmania. *R. Brown*, common, *J. D. Hooker*, *Gunn*.

W. Australia. *Drummond*.

The Australian variety above described, which occurs also in New Zealand, has smaller flowers and achenes, and they are more frequently sessile than in the usual typical form, which is widely spread over Europe.

***R. muricatus*, Linn. ; DC. Prod. i. 42.**—A densely-tufted annual, much larger and coarser than *R. parviflorus*; leaves much longer and usually less divided, flowers larger, yellow, on leaf-opposed peduncles; carpels flat, much mucronated, fully 2 lines long, with a flat, stout, recurved beak: a common weed in southern Europe and many parts of Asia, has now become wild about Melbourne.

***R. philonotis*, Retz ; DC. Prod. i. 41.** An annual, with 3-lobed or divided leaves like some of those of *R. parviflorus*, but larger and less hairy, and with much larger yellow flowers on terminal peduncles, with a closely-reflexed calyx: a common European species, has been found near the seacoast at Southport, in Tasmania, by *C. Stuart*.

5. CALTHA, Linn.

Sepals 5 or more, coloured and petal-like. Petals none. Carpels several, sessile, distinct, bearing several ovules in a double row along their inner angle, opening into follicles when ripe. Seeds obovoid; testa crustaceous, smooth, the raphe usually very prominent.—Glabrous, tufted, or stoloniferous herbs. Leaves mostly radical, entire or crenate, with palmate nerves, cordate at the base, or sagittate with the auricles or basal lobes turned upwards over their face. Scapes 1-flowered and leafless, or few-flowered with a small leaf at the base of each peduncle. Flowers yellow or rarely white.

The genus is confined to the temperate and cold regions of both the northern and southern hemispheres. The southern ones are almost always distinguished by the turned-up basal lobes of the leaves. The only Australian species is endemic, unless it prove a variety of the New Zealand one.

1. ***C. introloba*, F. Muell. in Trans. Phil. Soc. Vict. i. 98, and Pl. Vict. i. 10.** A dwarf, glabrous, somewhat succulent perennial. Rootstock thick, often elongated, producing numerous stoutish fibres. Leaves all radical, the petioles $\frac{1}{2}$ to 3 in. long, with broad, sheathing, membranous bases, forming a stem-like sheath, reaching to half their length, the blade hastate-ovate or ovate-lanceolate, $\frac{1}{2}$ to 1 in. or rather more in length, the 2 basal lobes turned over the upper surface, often reaching above half its length. Scapes 1-flowered, sometimes scarcely exceeding the leaf-sheaths, sometimes 6 to 8 in. high. Sepals 5 to 8, linear-lanceolate, 4 to 5 lines long. Stamens usually few. Carpels sometimes 5 or 6, sometimes above 20, ovate-falcate or shortly oblong, 2 to 3 lines long, and the outer ones almost horizontal when ripe, tipped by the persistent and usually straight style, containing 3 to 5 seeds.—*Hook. f. Fl. Tasm. ii. 355.*

Victoria. In gravelly places irrigated by the melting snows in the Australian Alps, *F. Mueller*.

Tasmania. Western Mountains, *Archer*.

Very closely allied to the *C. Nova-Zelandica*, *Hook. f.*, from New Zealand, which indeed appears only to differ in its broader and shorter leaves and recurved styles. It has also yellow flowers, whilst the Australian one has them white, perhaps only when fading; but the same difference in the colour of the flowers occurs in different plants of *C. palustris* in the Himalayas.

ORDER II. DILLENIACEÆ.

Sepals usually 5, persistent, imbricate in the bud. Petals 5 or rarely fewer, deciduous, imbricate in the bud. Stamens hypogynous, indefinite, few or numerous, or rarely definitely 10, free or rarely united in clusters. Anthers innate or adnate. Gynœcium of carpels several, free and distinct or cohering at the base, or rarely single and excentrical, 1-celled, with 1 or more ovules in each. Styles quite distinct and diverging. Fruit-carpels either indehiscent and succulent, or opening along the inner edge, or in two valves. Seeds furnished with an arillus; testa crustaceous. Embryo very small, at the base of a fleshy albumen.—Trees, shrubs, climbers, or herbs. Leaves alternate or very rarely opposite. Stipules minute or none. Flowers usually yellow or white.

A considerable Order, of which rather the larger portion, with regularly pinnate veins prominent on the under side of the leaves, is entirely tropical, and represented in Australia by a single species of *Wormia*. The remainder of the Order, forming the tribe *Hibbertiæ*, with the midrib of the leaf alone prominent, or rarely with reticulate veins, is almost entirely Australian, there being besides only one species known from New Caledonia and two from Madagascar.

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|--|-----------------------|
| Anthers elongated, opening in two pores at the top. Trees with large leaves, with raised parallel veins underneath | 1. <i>WORMIA</i> . |
| Anthers opening longitudinally. Undershrubs, shrubs, or rarely climbers. Leaves with a prominent midrib and obscure or reticulate veins. | |
| Perfect stamens free or nearly so, more than 10, or, if fewer, on one side of the pistil | 2. <i>HIBBERTIA</i> . |
| Stamens united in 5 clusters, or in 3 clusters with two separate stamens | 3. <i>CANDOLLEA</i> . |
| Perfect stamens 10 or fewer, in a complete ring round the pistil. | |
| No staminodia within the perfect stamens | 4. <i>ADRASTEA</i> . |
| Two staminodia within the perfect stamens. Branches leafless . . | 5. <i>PACHYNEMA</i> . |

1. *WORMIA*, Rottb.

Sepals 5, spreading. Petals 5. Stamens numerous, with erect linear anthers opening at the summit in two pores, the inner ones often longer and recurved. Carpels 5 to 10, scarcely cohering, with several ovules in each, dehiscent when ripe. Seeds with an arillus.—Trees often very lofty. Leaves large, with raised parallel veins diverging from the midrib, the petioles often bordered with narrow deciduous wings. Flowers large, in loose terminal panicles.

A tropical genus, extending over tropical Asia and the Indian Archipelago, with one Madagascar species. The only Australian one is endemic.

1. *W. alata*, *R. Br. in DC. Syst. Veg.* i. 434. Glabrous, or the young parts very slightly hoary. Leaves oval or nearly orbicular, rounded at both ends, 4 to 8 in. long, entire or slightly sinuate, rather rough to the touch, with about 9 prominent veins on each side of the midrib and transversely reticulate veinlets, the petiole 1 in. long or more, with longitudinal wings about 1 line broad, which fall off in the greater part of their length. Peduncles terminal, not usually exceeding the leaves, bearing 2 or 3 large flowers on pedicels of nearly 1 in. Sepals 6 to 8 lines long, ovate, concave,



ciliate. Petals obovate, $1\frac{1}{2}$ in. long, narrowed at the base. Stamens very numerous, the inner ones long and recurved, the others shorter, and the outermost sometimes small and barren. Gynæceum of 5 to 8 glabrous carpels, tapering into long recurved styles. Ovules 6 to 8 in each carpel.

Queensland. Endeavour river, Banks, *A. C. C.* — *Jan.* Cape York, McGillivray.

2. HIBBERTIA, Andr.

(*Hemistemma*, *Pleurandra*, and *Hibbertia*, DC.; *Ochrolasia*, Turcz.;
Hemistephus, Drummond.)

Sepals 5, spreading, sometimes shortly united at the base. Petals 5. Stamens indefinite, rarely fewer than 12, and then usually all on one side of the carpels, either all perfect or some of them reduced to staminodia, all free or the filaments shortly and irregularly united at the base; anthers erect, oblong, or rarely ovate or orbicular, opening in longitudinal slits. Carpels usually 2 to 5, rarely solitary or more than 5, free or shortly cohering on their inner edge, with 2 to 6 or rarely only 1 or more than 6 ovules in each. Styles filiform, diverging, terminal or almost dorsal. Fruit-carpels usually dehiscent at the top. Seeds reniform or nearly globular, with an entire or divided arillus.—Shrubs or undershrubs, usually much branched and low, erect or procumbent, sometimes almost herbaceous or climbing, rarely 5 or 6 feet high. Leaves usually small, alternate in all the Australian species, with a midrib prominent underneath, the lateral veins reticulate and rarely prominent. Flowers yellow or white, solitary and terminal, or (owing to the shortness or abortion of the flowering shoot) apparently axillary sessile in a tuft of floral leaves or pedunculate.

Besides the Australian species, there are only two known, both from Madagascar, belonging to the section *Hemistemma*, but with opposite leaves. The species of the first three of the following sections are usually distributed into two separate genera, *Hemistemma* and *Pleurandra*, the *Hemipleurandras* being referred sometimes to the one, sometimes to the other; but their characters appear to be much less important and less conformable to habit than was originally supposed, and I have followed Mueller in uniting them with *Hibbertia* as sections only.

SECT. I. Hemistemma.—Perfect stamens and staminodia all on one side of the carpels, the staminodia outside. Peduncles mostly 2- or more-flowered, except in 11. verrucosa.—All tropical species except *H. verrucosa*.

Leaves oblong or lanceolate, flat or the margins slightly recurved.

Leaves obtuse.

Leaves with recurved margins, narrowed into a petiole, rusty-brown underneath. Sepals obtuse

1. *H. Banksii*.

Leaves flat, closely sessile with a rounded base, white underneath. Sepals acute

2. *H. Brownei*.

Leaves acute or mucronate, white underneath.

Spikes terminal, several-flowered

3. *H. dealbata*.

Peduncles lateral, 2- or 3-, rarely 1-flowered

4. *H. candicans*.

Leaves narrow-oblong or linear, the margins revolute.

Leaves oblong-linear, thick, about $\frac{1}{2}$ in. long.

Leaves and calyx glabrous or scabrous with stiff stellate hairs.

Peduncles 1-flowered

8. *H. verrucosa*.

Leaves tomentose underneath. Sepals densely and softly vilous. Peduncles mostly 2- or 3-flowered

7. *H. ledifolia*.

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Leaves narrow linear, about 1 in. long.

Softly hairy 6. *H. Muelleri*.

Glabrous. Leaves white underneath 5. *H. angustifolia*.

(*Hemistemma*? *Leschenaultii*, DC. Syst. Veg. i. 414, is a species of *Beyeria*.)

SECT. II. **Hemipleurandra**.—*Perfect stamens all on one side of the carpels; staminodia 2 or 3 on each side of them, or more numerous and continued round the carpels, very rarely any outside the perfect stamens.*—All western species.

Peduncles bearing 2 or more sessile flowers in a one-sided spike.

Leaves glabrous. Staminnodia completing the ring of stamens . . . 9. *H. spicata*.

Leaves or sepals hirsute. Staminnodia few 10. *H. polystachya*.

Peduncles 1-flowered.

Leaves oblong or linear, very obtuse, stellate-tomentose or hoary underneath.

Leaves mostly above 1 in., the margins scarcely recurved.

Ovules 4 11. *H. furfuracea*.

Leaves mostly $\frac{1}{2}$ in., the margins much revolute. Ovules 2 . . . 12. *H. hypericoides*.

Leaves rigid, glabrous.

Leaves short, convex, reflexed 13. *H. microphylla*.

Leaves narrow-linear, the margins very closely revolute.

Leaves 2 to 4 lines, whitish, obtuse or recurved at the end . . . 14. *H. recurvifolia*.

Leaves mostly $\frac{1}{2}$ in., straight, obtuse 15. *H. lineata*.

Leaves very pointed 16. *H. acerosa*.

Flowers sessile.

Plant glabrous or nearly so. Leaves mostly $\frac{1}{2}$ in. Sepals shining . . . 17. *H. aurea*.

Leaves very obtuse, 2 to 3 lines long, hoary. Sepals pubescent . . . 18. *H. crassifolia*.

SECT. III. **Pleurandra**.—*Stamens all on one side of the carpels without any staminodia. Peduncle 1-flowered or none.*—Species all southern and eastern except *H. pedunculata* and *H. mucronata*, which are western.

Leaves obtuse or with a callous point, oblong or linear.

Flowers sessile.

Leaves with flat or slightly recurved margins, glabrous or slightly hairy.

Calyx glabrous 19. *H. nitida*.

Calyx very villous 20. *H. bracteata*.

Leaves with their margins much revolute.

Leaves softly pubescent or villous, oblong or linear.

Sepals 3 to 5 lines. Floral leaves usually as long or longer. Petals broadly obovate 21. *H. sericea*.

Sepals 2 lines. Floral leaves small. Petals narrow . . . 22. *H. hirsuta*.

Leaves narrow-linear, rigid, glabrous or scabrous . . . 23. *H. stricta*.

Flowers pedunculate.

Ovules 4 or more in each carpel.

Leaves obovate, oblong, or shortly linear 25. *H. Billardieri*.

Leaves narrow-linear.

Stems virgate, or with numerous ascending branches, or divaricately branched. Calyx glabrous, stellate-tomentose, or, if hirsute, pedicels very short 23. *H. stricta*.

Stems prostrate. Calyx hirsute, on rather long pedicels . . . 24. *H. humifusa*.

Ovules 2. Peduncles slender.

Leaves obovate, oblong, or shortly linear. Peduncles usually short 25. *H. Billardieri*.

Leaves narrow-linear. Peduncles slender, $\frac{1}{2}$ to 1 inch.

Stems diffuse 26. *H. gracilipes*.

Leaves narrow-linear, very acute, mostly pungent.

Flowers on slender peduncles. Stems procumbent or diffuse.

Leaves much revolute or nearly terete, slightly pointed . . . 26. *H. gracilipes*.

- Leaves nearly flat, rigidly pungent 27. *H. acicularis*.
 Flowers sessile or shortly peduncled. Leaves loose, channelled underneath. Sepals rather obtuse 23. *H. stricta*.
 Flowers sessile. Leaves crowded, convex underneath. Outer sepals mucronate or aristate 28. *H. mucronata*.
 (*Plourandra reticulata*, Hook. Journ. Bot. i. 245, described from a single specimen in leaf only, is probably some *Pullenaea*.)

SECT. IV. **Euhibbertia**.—Stamens placed all round the carpels, with occasionally small staminodia outside.

§ 1. *Tomentosa*.—Carpels usually tomentose or scaly and 2-ovulate. Stamens numerous, without any or rarely with small staminodia outside. Leaves flat or the margins slightly revolute, usually stellately tomentose or scaly. Flowers pedunculate, axillary.

- Leaves oval, oblong, or cuneate.
 Tomentum rigid, stellate, mixed with simple hairs. Leaves cuneate, $\frac{1}{2}$ to $\frac{3}{4}$ in. 29. *H. hermanniifolia*.
 Tomentum soft and velvety. Leaves oblong, 1 to 2 in. 30. *H. velutina*.
 Tomentum close and whitish, stellate with a scale-like base.
 Leaves $\frac{3}{4}$ to 1 in. long, with an intramarginal vein underneath. Peduncles 1 to 2 lines long 31. *H. oblongata*.
 Leaves $\frac{1}{2}$ to $\frac{3}{4}$ in., without intramarginal veins. Peduncles 1 to 2 lines long 32. *H. tomentosa*.
 Leaves $\frac{1}{2}$ to 1 $\frac{1}{2}$ in., without intramarginal veins. Peduncles 1 to 1 $\frac{1}{2}$ in. long 33. *H. cistifolia*.
 Leaves scabrous with scattered stellate hairs. Sepals very scaly. Peduncles 1 to 2 lines 34. *H. echinifolia*.
 Leaves narrow-linear.
 Tomentum stellate. Peduncles $\frac{3}{4}$ to 1 $\frac{1}{4}$ in. 35. *H. scabra*.
 Tomentum of peltate scales. Peduncles 1 to 3 lines 36. *H. lepidota*.

§ 2. *Vestita*.—Carpels (usually 3) villous, 4-6-ovulate. Stamens with or without staminodia outside. Leaves small, narrow, with revolute margins.

- Flowers sessile, or peduncles not exceeding the leaves.
 Stamens above 30, with several staminodia 37. *H. vestita*.
 Stamens under 15, without staminodia 38. *H. serpyllifolia*.
 Peduncles longer than the leaves. Stamens 15 to 25 39. *H. pedunculata*.

§ 3. *Ochrolasiæ*.—Carpels glabrous, 6-8-ovulate. No staminodia. Leaves with revolute margins. Bracts small 40. *H. ochrolasia*.

§ 4. *Fasciculatæ*.—Carpels glabrous, 2-6-ovulate. No staminodia. Leaves very narrow, convex underneath, the margins not revolute. Bracts small. Flowers sessile.

- Ovules 6 in each carpel. Plant glabrous, procumbent 41. *H. procumbens*.
 Ovules 2, or rarely 3 or 4 in each carpel. Leaves usually fine, much clustered, often hirsute or pubescent 42. *H. fasciculata*.

§ 5. *Bracteata*.—Carpels glabrous, 1-2-ovulate. No staminodia. Leaves flat or convex underneath. Flowers (except in *H. rostellata*) closely sessile within broad brown shining bracts, like those of some of the *Hemihibbertiæ*.

- Leaves very narrow, convex underneath.
 Leaves obtuse.
 Glabrous and green. Leaves not dilated at the top 43. *H. virgata*.
 More or less hoary. Leaves mostly slightly cuneate 44. *H. inclusa*.
 Leaves recurved and mucronate at the top 45. *H. rostellata*.
 Leaves flat, mostly oblong.
 Glabrous. Leaves seldom above $\frac{1}{2}$ in. 46. *H. glomerata*.
 Densely silvery-tomentose. Leaves $\frac{1}{2}$ in. or more 47. *H. argentea*.

Loosely pilose or pubescent. Leaves mostly above $\frac{1}{2}$ in.

Sepals very densely silky-hairy. Brown bracts very conspicuous 49. *H. montana*.

Sepals loosely hairy. Brown bracts short and thin 48. *H. pilosa*.

Sepals glabrous. Staminnodia several 61. *H. Mylnei*.

§ 6. *Subsessiles*.—Carpels glabrous. Stamens usually numerous, without staminodia. Leaves flat or the margins slightly recurved. Bracts small or passing into the sepals. Flowers sessile or nearly so.

Carpels 1-2-ovulate. Stems erect or diffuse.

Leaves mostly under 1 in. long.

Leaves linear-oblong or scarcely enlarged above the middle.

Stems usually erect or ascending 50. *H. linearis*.

Leaves obovate or cuneate. Stems usually diffuse or prostrate 51. *H. diffusa*.

Leaves 1 to 3 in. long. Plant softly hairy.

Leaves obovate-oblong, obtuse 50. *H. linearis*, var.

Leaves lanceolate 52. *H. saligna*.

Carpels 6-8-ovulate. Stems twining or trailing. Leaves large 53. *H. volubilis*.

§ 7. *Hemihibbertiæ*.—Carpels glabrous or rarely villous. Stamens very numerous, with several small, subulate or clavate staminodia outside. Leaves flat. Flowers pedunculate, except in *H. Mylnei*.

Leaves distinctly petiolate, ovate, or oblong, mostly toothed.

Carpels 10 or more, villous, 2-ovulate 54. *H. grossulariæfolia*.

Carpels 3, glabrous, 6- to 8-ovulate 55. *H. dentata*.

Leaves stem-clasping or tapering near the base and again dilated, glabrous.

Leaves ovate or oblong.

Leaves all perfoliate, the auricles combined. Sepals lanceolate 56. *H. perfoliata*.

Auricles rounded, shortly decurrent 57. *H. bracteosa*.

Auricles of most of the leaves distinct, angular, projecting beyond the stem. Sepals ovate-lanceolate 58. *H. amplexicaulis*.

Leaves linear, mostly auricled 59. *H. Cunninghami*.

Leaves oblong-lanceolate, tapering at the base, and half stem-clasping 60. *H. glaberrima*.

Leaves sessile, oblong, very hairy. Bracts at the base of the peduncle broad and brown, as in the *Bracteate*.

Sepals glabrous. Carpels 3. Flowers sessile 61. *H. Mylnei*.

Sepals very silky-hairy. Carpels 5.

Larger leaves obovate-oblong, toothed. Carpels villous 62. *H. lasiopus*.

Larger leaves narrow-oblong, entire. Carpels glabrous 63. *H. potentillæflora*.

§ 8. *Brachyanthere*.—Carpels glabrous. Stamens about 15 to 20, without staminodia. Anthers (except in *H. pungens*) ovate or orbicular, flattened, with introrse cells. Leaves narrow-linear. Flowers pedunculate.

Leaves rigid, pungent. Sepals about 2 lines. Anthers oblong 64. *H. pungens*.

Leaves rigid, recurved at the top. Sepals 5 to 6 lines. Anthers ovate 65. *H. nutans*.

Leaves slender, but stiff and almost cylindrical. Sepals not 2 lines.

Anthers orbicular 66. *H. leptopus*.

Leaves thin, flat. Sepals about 2 lines. Anthers broader than long 67. *H. stellaris*.

SECTION 1. *Hemistemma*, *R. Br. in DC. Syst. Vcg.* i. 412 (as a distinct genus).—Stamens usually numerous, all inserted on one side of the pistil, with smaller imperfect ones or staminodia outside of them; filaments short, anthers linear-oblong. Carpels 2, villous, with 2 or 3 ovules in each.

1. *H. Banksii*, *Benth.* Young branches and under side of the leaves

densely clothed with a short, soft, rusty tomentum. Leaves oblong, obtuse, 2 to 3 in. long, $\frac{1}{2}$ to near 1 in. broad, the margins more or less recurved, narrowed into a short petiole, glabrous above and somewhat shining when old, the pinnate and anastomosing veins prominent underneath. Spikes terminal, 1-sided, rusty-villous, about 1 in. long, the flowers closely sessile. Sepals about 4 lines long. Petals longer. Stamens about 20, obtuse, with half as many staminodia outside, about one-third shorter.—*Hemistemma Banksii*, R. Br. in DC. Syst. Veg. i. 414.

Queensland. Endeavour river, *Banks*.

2. **H. Brownei**, *Benth.* Young branches clothed with a short rusty down. Leaves oblong-lanceolate, obtuse or scarcely pointed, 2 to 3 in. long, closely sessile and very obtuse or rounded at the base, the margins flat, glabrous, and at length almost shining above, white underneath, with the midrib alone prominent and rust-coloured. Spikes terminal, 1-sided, silky-villous. Sepals scarcely 4 lines long, acute. Stamens nearly as in *H. Banksii*.

N. Australia? *R. Brown.* (*Hb. R. Br.*)

3. **H. dealbata**, *Benth.* Young branches minutely rusty-downy. Leaves oblong or oblong-lanceolate, obtuse with a small callous point, or rarely acute, 2 to 3 in. long, $\frac{1}{2}$ to $\frac{3}{4}$ in. broad, narrowed at the base, but sessile or very shortly stalked, the margins flat, glabrous above, white underneath, with a very close tomentum, the anastomosing veins rust-coloured. Spikes terminal, 1-sided, simple or forked, 1 to 2 in. long, rusty-tomentose or silky. Flowers closely sessile within lanceolate bracts. Stamens as in *H. Banksii*.—*Hemistemma dealbata*, R. Br. in DC. Syst. Veg. i. 413; Deless. Ic. Sel. i. t. 76.

N. Australia. Arnhem's Land, *R. Brown*; Port Essington, *Arnecke*, *A. Cunningham*, *Leichhardt*.

4. **H. candicans**, *Benth.* Like *H. dealbata* in the white tomentum that covers the under side of the leaves, but it is rather more silky or rusty on the peduncles and calyx, the leaves are rather narrower, and the inflorescence is very different; peduncles all axillary, $\frac{1}{2}$ to 1 in. long, bearing at their extremity 1 to 3 sessile flowers, and bracts and sepals usually broader. Stamens and carpels the same as in *H. Banksii*.—*Hemistemma candicans*, Hook. f. in Kew Journ. Bot. ix. 48, t. 2.

Queensland. Cape York, *McGillivray*; Albany Island, *F. Mueller*.

5. **H. angustifolia**, *Benth.* Branches very slender, with a very minute rusty down. Leaves very narrow-linear, obtuse or acute, 1 to 2 in. long, the margins revolute, glabrous and shining above, white or slightly ferruginous underneath, with a prominent rusty midrib. Spikes on slender terminal peduncles, consisting of 2 to 5 sessile flowers. Sepals about 3 lines long, densely and softly villous.—*Hemistemma angustifolium*, R. Br. in DC. Syst. Veg. i. 414; Deless. Ic. Sel. i. t. 77.

N. Australia. Arnhem's Land, *R. Brown.* (*Hb. R. Br.*)

6. **H. Muelleri**, *Benth.* Branches slender, as in *H. angustifolia*, but loosely villous with soft spreading hairs, intermixed with a closer tomentum. Leaves narrow-linear as in that species, and about 1 line long, nearly glabrous

above, white-cottony and hairy on the under surface, which is however almost concealed by the revolute margins. Spikes terminal or lateral, about 3-flowered. Sepals softly hairy, about 4 lines long. Stamens and carpels as in *H. Banksii* and *dealbata*.

N. Australia. Barren places at the mouth of the Victoria, Providence Hill, etc., *F. Mueller*.

7. *H. ledifolia*, *Benth.* Branches rigid, the young ones as well as the under side of the leaves densely covered with a rusty or whitish down. Leaves oblong-linear, about $\frac{1}{2}$ in. long, obtuse, rather thick, with the margins revolute, hoary above when young, but soon glabrous. Peduncles short, terminal, 1- to 3-flowered. Sepals ovate, about 5 lines long, thick and densely villous as well as the bracts. Petals scarcely longer. Stamens about 20, with about 15 shorter staminodia outside. Carpels very villous, with usually 3 ovules in each.—*Hemistemma ledifolium*, A. Cunn. Herb.

N. Australia. York Sound, *A. Cunningham*.

8. *H. verrucosa*, *Benth.* Much branched, the young shoots and leaves very scabrous, with tubercles forming the base of stellate hairs. Leaves linear-oblong, obtuse, $\frac{1}{4}$ to $\frac{1}{2}$ in. long, the margins very revolute. Peduncles all 1-flowered, very short, or seldom 4 or 5 lines long. Calyx about 3 lines, sometimes nearly glabrous, more frequently more or less covered with stellate hairs, which are sometimes stipitate, the outer sepals always acute, the inner more obtuse. Petals obovate, slightly obcordate. Stamens often under 10, with at least as many smaller staminodia outside. Carpels as in the allied species, 2, hairy and biovulate.—*Pleurandra verrucosa*, Turcz. in Bull. Mosc. 1852, ii. 139.

W. Australia. Cape Riche?, *Drummond*, 5th Coll. n. 289; Bald Island and Mount Monypack, *Maxwell*.—In habit and inflorescence this species resembles *H. hypericoides*, but the acute sepals, and especially the stamens, readily distinguish it.

SECTION II. HEMIPLEURANDRA.—Stamens rarely more than 12, all on one side of the pistil; staminodia small, usually subulate or club-shaped, either 2 or 3 on each side of the fertile ones, or continued round to the opposite side of the pistil, with very rarely any outside the fertile ones. Peduncles in two species bearing a 1-sided spike of several flowers, in all the others 1-flowered. Carpels 2, villous, with 2 or rarely 4 ovules in each. The species are all West Australian.

9. *H. spicata*, *F. Muell. Fragm.* ii. 1. Glabrous or very slightly and minutely pubescent. Leaves linear, usually obtuse, $\frac{1}{2}$ to 1 in. long, the margins much revolute. Peduncles lateral, usually longer than the leaves, bearing a 1-sided spike of 4 to 8 flowers. Sepals about 3 lines long, pubescent or shortly hairy. Petals deeply obcordate. Stamens usually 8 to 10 on one side of the carpels, with a ring of short, subulate or spatulate staminodia continued all round the carpels, and a few even behind the fertile ones.—*Hemistephus linearis*, J. Drumm. and Harv. in Kew Hook. Journ. vii. 52.

W. Australia. Flinders' Bay, *Collie*; Port Gregory, *Walcott* and *Oldfield*; northern districts, *Drummond*.

10. *H. polystachya*, *Benth.* Procumbent and much branched, with

spreading hairs, or at length scabrous only or nearly glabrous. Leaves narrow-linear, obtuse, 3 to 5 lines, or in some specimens $\frac{1}{2}$ in. long, the margins much revolute. Peduncles lateral, usually above 1 in. long, bearing a 1-sided spike of 2 to 4 flowers. Sepals broader and more scarious than in *H. spicata*, from which this species differs chiefly in its hairs, and in the staminodia, which although continued from the fertile stamens round the rest of the torus, yet are usually entirely wanting, or there is only a single one behind the perfect stamens. The 2 ovules in this and the last species do not appear to be really superposed, although one is usually borne on a much longer funiculus than the other.

W. Australia. Swan River, *Drummond*; Blackwood river, *Oldfield*.

11. *H. furfuracea*, *Benth.* Rather coarse and erect, 2 to 4 ft. high, the branches thickly clothed with rust-coloured, loosely stellate hairs. Leaves narrow-oblong or linear, very obtuse, 1 to 2 in. long, the margins revolute, but leaving the under surface open, villous above when young, scabrous when old, closely tomentose and white or hoary underneath. Peduncles mostly axillary, 1-flowered, $\frac{1}{2}$ to 1 in. long. Outer sepals ovate or ovate-lanceolate, sometimes near 5 lines long, inner ones shorter and rounder. Petals 2-lobed. Stamens 8 to 12, with numerous small staminodia on each side, and on the opposite side of the carpels. Carpels 2, globose, villous, 4-ovulate. Arillus very short.—*Pleurandra furfuracea*, R. Br. in DC. Syst. Veg. i. 417; Deless. Ic. Sel. i. t. 80; *Hibbertia astrophylla*, Steud. in Pl. Preiss. i. 270; *Hemistemma asperifolium*, F. Muell. Fragm. i. 161.

W. Australia. Rocky hills, from King George's Sound to the Stirling range, *R. Baxter*, *A. Cunningham*, *Drummond*, and others; rocks on the western side of Mount Clarence, *Preiss*, n. 2167.

12. *H. hypericoides*, *Benth.* Branches spreading, the young ones as well as the leaves hoary, with a short stellate down. Leaves linear-oblong, very obtuse, $\frac{1}{2}$ in. long or rather more, those of the smaller branches half as long, the thick margins much revolute. Peduncles mostly terminal, 1-flowered, $\frac{1}{4}$ to $\frac{1}{2}$ in. long. Sepals broad, very concave and obtuse, shorter than in *H. furfuracea*, hoary outside. Petals 2-lobed. Stamens 12 to 15, with rather numerous (or rarely very few) small spatulate or clavate staminodia on each side or on the opposite side of the carpels. Carpels connate at the base, globular, 2-ovulate.—*Pleurandra hypericoides*, DC. Syst. Veg. i. 421; Deless. Ic. Sel. i. t. 81; *Hibbertia trachyphylla*, Steud. in Pl. Preiss. i. 271; *H. aspera*, Steud. l. c. i. 270; *H. proxima* and *H. cinerascens*, Steud. l. c. i. 271.

W. Australia. Common about Perth, *Preiss*, n. 2132 and 2136 a, *Drummond* and others; Cape Leenwin, *Collie*; Port Gregory and Blackwood river, *Oldfield*; Darling range, *Preiss*, n. 2147; Cataract Valley, *Preiss*, n. 2140; between Perth and King George's Sound, *Harvey*; Stokes' Inlet, *Maxwell*.

13. *H. microphylla*, *Steud.* in Pl. Preiss. i. 273. Branches erect and rigid, or sometimes slender and decumbent or diffuse, minutely pubescent or glabrous. Leaves usually 1 to $1\frac{1}{2}$ line long, ovate and very convex, sometimes more linear and 2 lines long, always very convex and very patent or closely reflexed on the stem, glabrous or rough, with a minute pubescence. Peduncles 1-flowered, slender, often $\frac{1}{2}$ to $\frac{3}{4}$ in. long, arranged in the upper

axils so as to form a kind of leafy raceme towards the ends of the branches. Sepals 2 to near 3 lines long, glabrous or stellate-pubescent. Stamens 8 to 10 on one side of the pistil, with 1, 2, or 3 small spathulate staminodia on each side. Carpels 2-ovulate. Arillus very short.—*H. lepidophylla*, F. Muell. Fragm. i. 217; *Hemistemma revolutum*, Turcz. in Bull. Mosc. 1849, ii. 4.

W. Australia. King George's Sound, *Menzies, R. Brown*; and thence to the Stirling range, *Drummond, Preiss, n. 2154 and 2180, Oldfield*, and others.

14. **H. recurvifolia**, *Benth.* A shrub with the foliage nearly of *H. rostellata* or of *Candollea uncinata*, but with the flowers of a *Hemipleurandra*. Leaves narrow-linear, rigid, obtuse and hooked or recurved at the extremity, 2 to 4 lines long, convex underneath, but furrowed by the closely recurved margins, whitish on both sides but glabrous, or with a minute tuft of short hairs at the tip. Peduncles 3 to 5 lines long, nearly glabrous. Sepals whitish, about 2 lines long, the outer ones keeled and acute, surrounded by 2 or 3 small bracts. Stamens about 8 on one side of the pistil, with a few small staminodia on each side or behind them. Carpels villous, 2-ovulate.—*Pleurandra recurvifolia*, Steud. in Pl. Preiss. i. 264.

W. Australia. Gravelly places at the foot of the Konkoberup hills, *Preiss, n. 2170*; Phillips river, *Maxwell*.

Var. *virens*. Leaves rather longer, the margins more prominently revolute, green but rough with small tubercles or a short stellate pubescence. —Point Henry, *Oldfield*.

15. **H. lineata**, *Steud. in Pl. Preiss. i. 272.* Intermediate as it were between *H. hypericoides*, *H. recurvifolia*, and *H. acerosa*, differing from the first by its leaves much narrower, with the margins closely revolute so as to appear 2- or 3-grooved on the under side, either glabrous or rough, with scattered tubercles or a few spreading hairs; from *H. recurvifolia*, by the leaves nearly twice as long, not hoary, quite straight or scarcely perceptibly recurved at the tip; and from *H. acerosa* by the leaves not pungent, either obtuse or with a minute recurved point. The flowers in *Preiss's* original specimens are rather larger than in *H. acerosa*, of which species this plant may prove to be a variety.

W. Australia. Shady woods on the north side of Mount Wuljenup, *Preiss, n. 2151*; Mount Monypack river, *Maxwell*.

Var. *parviflora*. Flowers small, as in *H. acerosa*, midrib of the leaves less prominent underneath.—*Pleurandra diamesogenos*, Steud. in Pl. Preiss. i. 265.—Boggy woods, Sussex district, *Preiss, n. 2141*. This variety approaches *H. gracilipes* in aspect, but is readily distinguished by the presence of staminodia.

16. **H. acerosa**, *Benth.* Usually low and very much branched, but sometimes throwing up ascending stems of nearly 1 ft. from a thick base, glabrous or rough with short spreading hairs. Leaves linear-subulate or broader at the base, very pointed and usually pungent, 4 lines to 1 in. long, erect or spreading, the margins closely revolute, but much narrower than the broad prominent midrib. Peduncles 1-flowered, slender, $\frac{1}{2}$ to 1 in. long. Flowers nearly those of *H. acicularis*, except that there are always 1, 2, or 3 small club-shaped or spatulate staminodia on each side of the fertile stamens. Carpels 2-ovulate.—*Pleurandra acerosa*, R. Br. in DC. Syst. Veg. i. 422; *P. cognata*, Steud. in Pl. Preiss. i. 265; *P. juniperina*, Turcz. in Bull. Mosc. 1849, ii. 6.

W. Australia. King George's Sound, *R. Brown, Fraser*, and others; Swan River, *Drummond*, 1st Coll. and 1845, n. 2; Mount Melville, *Preiss*, n. 2156; Champion Bay, *Oldfield*.

Var. *ulicifolia*. Leaves stouter and not so long. King George's Sound, *Baxter*.

17. **H. aurea**, *Steud.* in *Pl. Preiss.* i. 272. Rigid, and somewhat virgate, perfectly glabrous, or the leaves slightly scabrous, and sometimes shortly ciliate. Leaves narrow-linear and stiff, shortly pointed, the lower ones $\frac{1}{2}$ to $\frac{3}{4}$ in., those near the flowers about half as long, the margins much revolute. Flowers terminal, sessile, with 2 or 3 small sepal-like bracts at their base. Outer sepals fully 3 lines long, stiffly coriaceous and almost shining, with a prominent keel projecting into a sharp point, inner ones less pointed, broader and thinner. Petals broad. Stamens about 10, one-sided, with 2 to 4 small staminodia on each side of them. Carpels 2-ovulate.—*H. pallida*, *Steud.* in *Pl. Preiss.* i. 272.

W. Australia. Swan River, *Drummond*: in gravelly places at the foot of Darling range, *Preiss*, n. 2152 a and 2152 b.

Var. *obtus.* Leaves obtuse, sepals scarcely keeled or pointed.—*Pleurandra glaucophylla*, *Steud.* in *Pl. Preiss.* i. 262. The fragments I have seen without flowers agree with this variety; but *Steud.* describes the ovaries as glabrous, which I have not observed in any *Hemipleurandra*. He does not describe the stamens, but I know of no other western group to which his specimen could be referred. Swan River, *Drummond*; sandy places near Avon Dale, York District, *Preiss*, n. 2159.

18. **H. crassifolia**, *Benth.* Erect, with the habit of some of the hoary varieties of *H. stricta*. Leaves linear-oblong, very obtuse, 2 to 3 lines long, the margins much rolled back, rather thick, hoary or rough with very short stellate hairs, the floral ones ovate-lanceolate passing into the bracts. Flowers closely sessile, solitary, and terminal. Sepals ovate, brown, slightly hoary, nearly 3 lines long, surrounded by several bracts. Stamens about 12, one-sided, with 3 or 4 spatulate staminodia on each side of them, and not half so long. Carpels 2-ovulate.—*Pleurandra crassifolia*, *Turez.* in *Bull. Mosc.* 1849, ii. 5.

W. Australia. *Drummond*, 4th Coll. n. 120.

SECTION III. PLEURANDRA.—Stamens often very few, and rarely more than 15, all on one side of the pistil, and often more or less united at the base, without any staminodia. Peduncles 1-flowered, or flowers sessile, solitary, or in terminal heads. Carpels 2, villous or tomentose, or very rarely glabrous, with 2, 4, or more ovules in each.

19. **H. nitida**, *Benth.* Erect, much branched and glabrous. Leaves crowded, especially under the flowers, oblong, obtuse, or with a short point, $\frac{1}{2}$ to $\frac{3}{4}$ in. long, narrowed at the base, the margins flat or slightly recurved, and somewhat coriaceous and shining. Flowers sessile within the last leaves, and surrounded by a few short bracts. Sepals lanceolate or oblong, very pointed and quite glabrous, 3 to 5 lines long. Petals broad and notched. Stamens about 11. Carpels hairy, 4-ovulate. Arillus slightly sinuate.—*Pleurandra nitida*, *R. Br.* in *DC. Syst. Veg.* i. 416; *P. Cneorum*, *DC.* l. c. i. 416.

N. S. Wales. About Port Jackson, *R. Brown, Sieber*, n. 141 and *Pl. Miet.* n. 508, and others.

20. **H. bracteata**, *Benth.* Erect and much branched, with the aspect

of *Pultenaea daphnoides*, and resembles also *H. nitida*, but is not so glabrous. Leaves narrow-oblong, mostly obtuse, with a short callous point, $\frac{1}{2}$ to $\frac{3}{4}$ in. long, narrowed at the base, the margins slightly recurved, somewhat rusty, with a minute tomentum underneath, glabrous and shining or scabrous above, or occasionally bearing a few long hairs. Flowers terminal, or on very short axillary branches, sessile within a tuft of floral leaves, which are mostly longer than the flowers, except a few of the innermost, which are much shorter and more hairy. Sepals oblong-lanceolate, fully 5 lines long, densely clothed with long silky hairs. Petals broad, notched. Stamens about 16. Carpels hairy, with 4 to 6 ovules in each.—*Pleurandra bracteata*, R. Br. in DC. Syst. Veg. i. 415; Deless. Ic. Sel. i. t. 78.

N. S. Wales. Port Jackson to the Blue Mountains, *R. Brown* and others; Fann Plains, *A. Cunningham*.

21. ***H. sericea*, Benth.** A variable species which sometimes scarcely differs from *H. bracteata*, except in being much more hairy and the leaves more revolute on the margin, but is usually more diffuse or procumbent, softly villous all over, with the floral leaves not much longer than the others. Leaves rarely much above $\frac{1}{2}$ in. long, and in some varieties much shorter, obtuse, with the margins much revolute, clothed with stellate down, especially underneath, with longer hairs on the upper surface. Flowers sessile among crowded floral leaves, as in the last two species. Sepals rather shorter and broader, villous. Stamens usually 10 to 12. Carpels tomentose or villous, with 4 to 6 ovules in each.—*Pleurandra sericea*, R. Br. in DC. Syst. Veg. i. 416; Deless. Ic. Sel. i. t. 79; Hook. f. Fl. Tasm. i. 16; *H. densiflora*, F. Muell. Pl. Vict. i. 15. *Pleurandra cinerea*, R. Br. in DC. l. c. i. 417, is a slight variety with shorter pubescence, and shorter, more oblong leaves, the flowers often very shortly pedicellate.

Victoria. Port Phillip, *R. Brown*; sandy heathy places on barren scrubby ridges, and occasionally on rocky ranges from the Glenelg to the Murray rivers, and thence to Port Phillip, *F. Mueller* and others.

Tasmania. Common on sandy soil, on the coast only, all round the island, *J. D. Hooker*.

S. Australia. Near Adelaide, *Macarthur*, *F. Mueller*.

Var. *densiflora*. More villous. Leaves, especially the floral ones, shorter. Stems usually more procumbent.—*Pleurandra densiflora*, Hook. f. in Journ. Bot. i. 245. The Tasmanian specimens belong chiefly, but not entirely, to this variety, and a few of the Victorian ones are referrible to it.

22. ***H. hirsuta*, Benth.** A low, prostrate, densely branched species, with much smaller leaves and flowers than in any of the same section, resembling some forms of *H. fasciculata*, and shortly hirsute all over. Leaves linear-oblong, obtuse, $1\frac{1}{2}$ to 2, or seldom 3 lines long, with revolute margins. Flowers axillary or terminal, sessile within leaves often as long as the calyx, the innermost of which are however much smaller. Sepals ovate, villous, scarcely 2 lines long. Petals narrow and entire or very slightly obcordate. Stamens very few. Ovaries 2, pubescent, with 4, or very rarely only 2 ovules in each.—*Pleurandra hirsuta*, Hook. Comp. Bot. Mag. i. 273; Hook. f. Fl. Tasm. i. 17.

Tasmania. Among stones in basaltic soil, George Town and Hobart Town, *J. D. Hooker*, *Gunn*, and others.

23. *H. stricta*, R. Br. *Herb.*; F. Muell. *Pl. Vict.* i. 15. Erect, spreading, or diffuse, but scarcely prostrate, sometimes throwing up almost simple stems of 6 in. from a thick rhizome, sometimes attaining several feet in height, more or less hoary or scabrous, with a minute stellate tomentum, although sometimes appearing glabrous at first sight. Leaves narrow-linear, erect or spreading, rather obtuse, mostly $\frac{1}{4}$ to $\frac{1}{2}$ in. long, the closely revolute margins disclosing little more than the midrib underneath. Flowers nearly sessile, or on pedicels of 2 or 3 lines in length. Sepals usually about 3 lines long, oblong, lanceolate, or the inner ones ovate. Stamens usually 8 to 12. Carpels tomentose, or very rarely glabrous, with 4 to 6, or very rarely more ovules in each. Arillus usually very small.—*Pleurandra stricta*, R. Br. in DC. *Syst. Veg.* i. 422; *P. riparia*, R. Br. in DC. l. c. i. 419; *P. cricifolia*, DC. l. c. i. 420; Hook. f. *Fl. Tasm.* i. 17; *P. cistiflora*, Sieb. in Spreng. *Syst. Cur. Post.* 191; Reichb. *Icon. Exot.* t. 79.

Queensland. Port Curtis, *McGilveray*; Moreton Bay, *F. Mueller*, and inland to the ranges on the Burritt river, *D. Moore*, and Maranoa river, *Mitchell*.

N. S. Wales. Port Jackson, *R. Brown* and others, and apparently throughout the colony.

Victoria. In sandy, rocky, or heathy localities of the lowlands and hills, not rare, *F. Mueller*.

Tasmania. Abundant throughout the island, *J. D. Hooker*.

S. Australia. From the Murray to Streaky Bay, *Whiteaker*, *F. Mueller*, *Warburton*, and others.

W. Australia. Only at the extreme eastern limits on the south coast, *Maxwell*.

This is a very variable species, with the flowers seldom so closely sessile as in the preceding ones, nor borne on peduncles so long as in most of the following ones. There are a few specimens, however, which come near to the narrow-leaved forms of *H. Billardieri*, and others which are very close upon *H. humifusa*. The following are the most striking forms:—

a. glabrescens. Glabrous or nearly so, procumbent or erect. Flowers nearly sessile. Calyx not hoary. Carpels tomentose. Ovules 4 to 6. The commonest form in N. S. Wales, southern Victoria, and Tasmania, including Sieber's n. 150 (*P. riparia*), 151 (*P. stricta*), and 147 (*P. fumosa*), the latter a straggling variety approaching *H. Billardieri* in habit. No. 148 (*P. cistiflora*) is the same, with longer, more acute, sometimes almost pungent leaves, from the Blue Mountains; and a form with very short obtuse leaves appears to be common about Lake Hindmarsh, in Victoria.

b. leiocarpa. Procumbent and perfectly glabrous, even the carpels. Ovules 4. From the south coast of W. Australia, east of Stokes Inlet, *Maxwell*.

c. canescens. Leaves and calyx more or less hoary with stellate hairs. Flowers pedunculate or more rarely sessile. Ovules usually 4.—*Pleurandra incana*, Lindl. in Mitch. Three Exped. ii. 156. Apparently common in Victoria, extending also over N. S. Wales into Queensland and westward to Spencer's Gulf. In this I should include *P. microphylla*, Sieb. Pl. Exs. n. 143; Spreng. *Syst. Cur. Post.* 191, a small-flowered and small-leaved form from the Blue Mountains and from Tasmania, *Guad. n.* 1020; and *P. cisteidea*, Hook. in Mitch. *Trop. Austr.* 363, from New England, *C. Stuart*, and Queensland, *Mitchell*. *d. calycina.* Leaves narrow and acute or almost pungent. Calyx hirsute, almost as in the var. *hirtiflora*. *Pleurandra calycina*, DC. *Syst. Veg.* i. 422 (judging from a specimen of Caley's named *P. pilosa* in Herb. Brown, but which quite agrees with De Candolle's description of *P. calycina*). N. S. Wales, *Caley*; Avon Ranges, Gipps' Land, *F. Mueller*.

e. hirtiflora. Leaves nearly as in the var. *canescens*. Calyx usually large, more sessile, and hirsute with spreading hairs. Ovules usually 6 to 8 or more. *P. calycina*, A. Cunn. in Field N. S. Wales, 338. On the Maranoa river, *Mitchell*; Moreton Bay, *F. Mueller*; New England Ranges, *C. Stuart*; near Bathurst, *A. Cunningham*; and almost the same form from Spencer's Gulf and Streaky Bay, *Herb. Mueller*.

24. *H. humifusa*, F. Muell. *Pl. Vict.* i. 16, t. *Suppl.* 1. Prostrate,

much branched, hoary, and more or less hirsute, like the *H. hirsuta*, with linear obtuse leaves, the margins much revolute, but these leaves are usually longer and the flowers much larger, always borne on a pedicel of from $\frac{1}{4}$ to $\frac{1}{2}$ in. From some specimens of *H. stricta*, var. *hirtiflora*, it differs chiefly in its low, prostrate habit, in being more hairy, and the peduncles much longer. Sepals 4 to 5 lines long, and very hairy. Petals, stamens, and carpels of *H. stricta*. Ovules usually 6.

Victoria. Barren scrubby plains near Mount Zero, *F. Mueller*.

25. *H. Billardieri*, *F. Muell. Pl. Vict.* i. 14. Stems weak, sometimes short and erect, but more frequently trailing to the length of two or three feet or more over other shrubs, the branches clothed with stellate hairs, often mixed with long spreading ones. Leaves from obovate, ovate or oval-oblong to oblong-cuneate or narrow-oblong, the larger ones $\frac{1}{2}$ to 1 in. long, but in the commoner slender varieties not half that size, the margins recurved, more or less stellately pubescent, especially underneath, and scabrous above, but becoming glabrous with age. Pedicels terminating short, leafy shoots, or apparently axillary, slender, and recurved, $\frac{1}{4}$ to $\frac{1}{2}$ in. long. Sepals 2 to 3 lines long, or in some varieties rather shorter or longer, the outer ones usually pointed, the inner broader and more obtuse, glabrous, or nearly so. Petals broad. Stamens usually 10 to 12. Carpels downy or villous, with 2 to 4 ovules. Arillus sometimes almost enveloping the seed, sometimes very short.—*Pleurandra ovata*, Labill. Pl. Nov. Holl. ii. 5, t. 143; Hook. f. Fl. Tasm. i. 16.

Queensland. Glasshouse Mountains, *F. Mueller*.

N. S. Wales. Port Jackson, *R. Brown*, *Sieber*, n. 141, and others; Hastings river, *Beckler*.

Victoria. Scattered over the southern part of the colony, *F. Mueller*.

Tasmania. Sandy soils on the coast in various places, *J. D. Hooker*, *Gunn*.

S. Australia. Spencer's Gulf, *F. Mueller*.

Although apparently not so common as *H. stricta*, this species appears to be more variable, and the following forms have in general the appearance of distinct species, but are always too much connected by intermediate specimens to admit of their being characterized as such.

a. monadelphæ, *F. Muell. nss.* Leaves large, obovate or oblong. Flowers large. Ovules 4. Sealers' Cove, *F. Mueller*; Flinders Island, *Gunn*.

b. obovata. Leaves and flowers of *a*, but ovules only 2.—*Pleurandra obovata*, *R. Br. Herb.*, from Port Dalrymple; Hastings river, *Beckler*; West Head, Tasmania, *Gunn*.

c. ovata. Leaves and flowers small, ovate or oblong. Ovules 2. The most common Tasmanian and N. S. Wales form.

d. scabra. Leaves narrow, seldom (except a few of the lower ones) above 4 lines long, and usually much revolute on the margin.—*Pleurandra scabra*, *R. Br. in DC. Syst. Veg.* i. 418; *P. empetrifolia*, *DC. l. c.* i. 420; *P. asterotricha*, *Sieb.* in Spreng. Syst. Cur. Post. 191; *Pl. Exs.* n. 149, and *Fl. Mixt.* n. 505 (n. 139, *P. cinerea*, is a rather more canescent form). Common about Sydney.

e. parviflora. Slender and much branched. Leaves 2 to 4 lines long, from obovate to linear-oblong, flat or much revolute. Sepals under 2 lines long. Ovules 2, or rarely 4. — *Pleurandra parviflora*, *R. Br. in DC. Syst. Veg.* i. 418; *Hibbertia aspera*, *DC. Syst. Veg.* i. 430. Port Jackson, *R. Brown*; *Sieber*, n. 141, and *Fl. Mixt.* n. 504, and others.

26. *H. gracilipes*, *Benth.* Nearly glabrous, diffuse or prostrate, and much branched, with much of the appearance of *H. acicularis*, but the leaves are usually broader and not pungent. They are narrow-linear, usually very

obtuse, 2 to 4, or even 5 lines long, with the margins revolute, and often slightly scabrous. Peduncles slender, $\frac{1}{2}$ to 1 in. long, thickened under the flowers. Sepals 2 to nearly 3 lines long, membranous, obtuse. Stamens usually about 10. Carpels glabrous or downy, 2-ovulate.—*Pleurandra pedunculata*, R. Br. in DC. Syst. Veg. i. 419.

W. Australia. South coast?, *Dumort.*, n. 16, 9, 4; Lucky Bay, *R. Brown*; King George's Sound and Gordon river, *Oldfield*.

27. **H. acicularis**, *F. Muell. Pl. Fict.* i. 17. Nearly or quite glabrous, procumbent or diffuse, with a thick woody stock, and numerous branches, short and intricate, or lengthened to a foot. Leaves narrow-linear, rigid, with a stiff, often pungent point, about 3 to 6 lines long, the margins recurved. Pedicels terminal or axillary, often on very short shoots, with a few leaves at the base sometimes reduced to minute bracts, recurved, $\frac{1}{4}$ to $\frac{1}{2}$ in. long. Sepals glabrous, or very slightly downy, about 2 lines long. Stamens usually 8, or fewer. Carpels downy, or rarely glabrous, with 2, or very rarely 4 ovules.—*Pleurandra acicularis*, Labill. Pl. Nov. Holl. ii. 6, t. 114; Hook. f. Fl. Tasn. i. 15.

Queensland. Moreton Island, *F. Mueller*.

N. S. Wales. Port Jackson, *R. Brown* and others; sterile bushy hills in Wellington Valley, and westward to Croker's range, *J. Cunningham*; New England, *C. Stuart*. The Port Jackson specimens include a variety with more rigid leaves and larger flowers, and another with glabrous ovaries.

Victoria. Heathy ground, particularly in moist localities near the coast, *F. Mueller*. Some Port Adelaide specimens are the only ones I have seen with 4 ovules to each carpel.

Tasmania. Sandy land at George Town, sea-coast E. of Port Dalrymple, and islands of Bass's Straits, *J. D. Hooker, Gunn*.

Pleurandra triandra, Turcz. in Bull. Mosc. 1854, ii. 280, described from a specimen said to have been gathered by Gunn "near Sydney in Tasmania," may possibly belong to this species.

28. **H. mucronata**, *Benth.* Erect and rigid, the young branches shortly villous. Leaves crowded, erect, rigid, linear, and very pungent, mostly 4 to 6 lines long, semiterete, but marked with a furrow on each side of the midrib indicating the revolute margins, glabrous, or the young ones bearing a few spreading, silky hairs. Flowers sessile, the leaves of the very short floral shoots passing into 2 or 3 subulate bracts. Sepals 3 to 4 lines long, loosely villous, the outer ones with long pungent points, the inner ones shorter and less pointed. Petals broadly 2-lobed. Stamens about 5. Carpels very villous, 2-ovulate.—*Pleurandra mucronata*, Turcz. in Bull. Mosc. 1849, ii. 139.

W. Australia. Between Swan River and Cape Riche, *Dumort.*, 5th Coll. n. 290; King George's Sound, *R. Brown*; W. Mount Barren, *Maxwell*.

SECTION IV. EUHIBBERTIA.—Stamens usually numerous, and rarely fewer than 12, arranged all around the pistil, although sometimes more numerous on one side than on the other, either without any staminodia, or with few or many small subulate or clavate staminodia outside the perfect stamens.—*Hibbertia proper*, as limited by De Candolle, and most authors.

§ 1. *Tomentosæ*.—Carpels 2 (or very rarely and exceptionally 3), tomentose, or covered with peltate scales, with 2, or very rarely 1 or 3 ovules in

each. Stamens numerous, without any, or rarely with small staminodia outside. Leaves ovate, obovate, cuneate, oblong, or linear, flat, or with the margins slightly revolute, usually covered with stellate hairs or peltate scales. Flowers axillary, pedunculate, with a small bract under the sepals, those at the base of the peduncle minute or wanting. The species are all tropical or subtropical.

29. *H. hermanniæfolia*, DC. *Syst. Veg.* i. 431. Resembles in general aspect *H. furfuracea*, but very different in the stamens. Whole plant covered with a rather rigid stellate down, mixed, especially on the upper side of the leaves, with simple hairs. Leaves from obovate-oblong to cuneate, very obtuse or retuse, $\frac{1}{2}$ to $\frac{3}{4}$ in. long, the margins not recurved. Peduncles axillary, mostly about $\frac{1}{2}$ in. long. Sepals about 4 lines, rather obtuse, membranous, pubescent. Stamens about 15. Carpels 2, villous, with 2 (or perhaps sometimes 4?) ovules in each.

N. S. Wales? "Dovedale," Caley. I have been unable to find the locality in any of our maps. (*Hb. Brit. Mus.*)

30. *H. velutina*, R. Br. *Herb.* Whole plant clothed with a soft, velvety tomentum. Leaves oval or oval-oblong, sometimes slightly cuneate, obtuse, 1 to 2 in. long, the margins scarcely recurved, and very soft. Peduncles axillary, $\frac{1}{4}$ to $\frac{1}{2}$ in. long. Sepals about 3 lines long, softly tomentose. Petals broadly obovate. Stamens numerous. Carpels 2?, tomentose.

Queensland. N. E. Coast, R. Brown. (*Hb. R. Br.*)

31. *H. oblongata*, R. Br. in DC. *Syst. Veg.* i. 431. Branches rather slender and elongated, covered as well as the leaves with a close whitish tomentum consisting of stellate hairs more or less united into a scale at their base. Leaves narrow-oblong, obtuse or with a very short slightly recurved point, mostly $\frac{3}{4}$ to 1 in. long, the margins flat, the lateral veinlets converging on the under side into an intramarginal vein. Peduncles axillary, seldom above 2 lines long. Inner sepals about 3 lines long, obtuse, the outer shorter and more acute. Petals 2-lobed. Stamens above 20, all perfect or rarely one or two on the side where there are fewest reduced to small staminodia. Carpels 2, scaly-tomentose, 2-ovulate.

N. Australia. Gulf of Carpentaria, R. Brown; rocky situations, Sims' Island, A. Cunningham; sandstone ravines on the table-land and rocks on the Fitzmaurice river, F. Mueller.

Var. *brevifolia*. Leaves mostly 3 to 4 lines long.—Upper Victoria river, F. Mueller.

32. *H. tomentosa*, R. Br. in DC. *Syst. Veg.* i. 432. Allied to *H. oblongata*, but more slender and much more branched. Leaves oblong-linear, 3 to 4 lines long or very seldom $\frac{1}{2}$ in., hoary on both sides, with a minute close tomentum, and without the intramarginal vein of *H. oblongata*. Flowers smaller, with the sepals more prominently keeled.

N. Australia. Gulf of Carpentaria, R. Brown. (*Hb. R. Br.*) This and some other species of the present group may possibly, when better known, be reduced to varieties.

33. *H. cistifolia*, R. Br. in DC. *Syst. Veg.* i. 431. Resembles *H. oblongata* in the whitish tomentum, consisting of stellate hairs proceeding from a scale-like base, which covers every part, but the branches appear to be diffuse or shortly trailing from a woody rhizome, the leaves are broader, from

obovate to oblong, $\frac{1}{2}$ to $1\frac{1}{2}$ in. long, and without the intramarginal nerve, and above all, the flowers are borne on peduncles of 1 to $1\frac{1}{2}$ in. long. They are also larger, and have above 50 stamens without any staminodia. Carpels 2, very scaly, 2-ovulate.

N. Australia. Gulf of Carpentaria, *R. Brown*; Port Essington, *Armstrong*.

34. **H. echiifolia**, *R. Br. Herb.* Branches diffuse, flexuose, hoary with a minute scabrous tomentum, with prominent angles decurrent from the base. Leaves oblong or ovate-oblong, very obtuse, mostly about $\frac{1}{2}$ in., but the larger ones often above an inch long, rigid, not hoary but very rough with minute stellate scales. Peduncles very short, rarely 2 lines long, axillary, or more frequently terminating short leafy branches. Sepals broad, concave, rigid, about 3 lines long, densely covered with peltate scales. Stamens numerous. Carpels 3 or 4, scaly (2-ovulate?).

N. Australia. N. coast, *R. Brown.* (*Hb. R. Br.*)

35. **H. scabra**, *R. Br. Herb.* Branches slender, scabrous as well as the upper side of the leaves with minute stellate hairs. Leaves like those of *H. angustifolia*, narrow-linear, $\frac{3}{4}$ to $1\frac{1}{2}$ in. long, acute or scarcely obtuse, the margins slightly revolute, very closely and minutely tomentose underneath. Peduncles axillary, $\frac{3}{4}$ to $1\frac{1}{4}$ in. long. Sepals about 3 lines, acute, tomentose outside. Petals obovate. Stamens numerous. Carpels 2 or 3, tomentose, 2-ovulate (according to *R. Brown's* notes).

N. Australia. N. coast, *R. Brown.* (*Hb. R. Br.*)

36. **H. lepidota**, *R. Br. in DC. Syst. Veg.* i. 432. Branches stiff but slender, covered as well as the leaves and sepals with a close silvery or slightly rusty tomentum, consisting of minute peltate scales with scarious edges. Leaves linear, rather acute, mostly $\frac{1}{2}$ to $\frac{3}{4}$ in. long, concave, the margins not revolute. Flowers rather small, on pedicels of 1 to 3 lines, solitary or 2 or 3 together in the axils. Sepals broad, very obtuse, about 2 lines long, or 3 when in fruit, the 2 outer rather shorter. Stamens about 12, mostly, but not all, on one side of the carpels, with several small staminodia outside. Carpels 2, scaly-tomentose, 2-ovulate.

N. Australia. Gulf of Carpentaria, *R. Brown*, *A. Cunningham*; rocky barren sandstone table-land at the sources of Roper river, at the head of Macarthur river, Upper Victoria river, and near M'Adam range, *F. Mueller*.

§ 2. *Vestiteæ*.—Carpels usually 3, villous, with 4 to 6 ovules in each. Stamens rather numerous, with small staminodia outside, or fewer without staminodia. Leaves small, narrow, with revolute margins. Bracts small. Flowers sessile or pedunculate.

37. **H. vestita**, *A. Cunn. Herb.* Branches elongated, decumbent or erect, clothed as well as the young leaves with short spreading hairs. Leaves narrow-linear, obtuse, 3 to 4 lines long, rigid with recurved margins, often glabrous when full grown. Flowers nearly sessile, in clusters of floral leaves shorter than them, the inner ones passing into small linear bracts. Sepals ovate-lanceolate, obtuse, or the outer ones scarcely acute, 3 or even 4 lines long, with rather silky hairs outside. Petals obovate, deeply emarginate. Stamens above 30, with several short filiform or clavate staminodia outside.

Carpels 3, villous, 6-ovulate. The general aspect is sometimes that of *H. serpyllifolia*, but it is readily known by the stamens:

Queensland. Open forest-land near Moreton Bay, *A. Cunningham*; Stradbroke Island, *Fraser*; Glasshouse mountains, *F. Mueller*; swamps towards Durval, *Leichhardt*.

N. S. Wales. Clarence river, *Beckler*.

Var. *thymifolia*. Leaves shorter, often recurved at the end.—Near Moreton Bay, *A. Cunningham*.

38. *H. serpyllifolia*, *R. Br. in DC. Syst. Veg.* i. 430. Decumbent or prostrate, much branched, and either glabrous or the branches and young parts clothed with short spreading hairs. Leaves (like those of *H. vestita*) narrow-linear, obtuse, 2 to 4 lines long, rigid with recurved margins. Peduncles very short, rarely attaining 2 or 3 lines, with 2 or 3 small bracts at their base. Sepals about 2 lines long, acute or the inner ones obtuse, glabrous or hairy. Stamens about 12, without staminodia. Carpels 3, villous, 4-ovulate.—*H. ericifolia*, Hook. f. *Fl. Tasm.* i. 11. t. 3; *F. Muell. Pl. Viet.* i. 17.

N. S. Wales. Port Dalrymple, *Caley*; Shoalwater Bay and Passaic, *R. Brown*.

Victoria. Stony mountains, particularly in the highlands, also on subalpine meadows, *F. Mueller*.

Tasmania. Common on the serpentine formation, Asbestos hills; also Launceston and George Town, *Gunn*.

Var. *minutifolia*. Leaves 1 to 2 lines long. Mount Aberdeen, *F. Mueller*. These specimens may possibly belong to the small-leaved variety of *H. pedunculata*, but the shortness of the peduncle and general aspect bring them nearer to *H. serpyllifolia*.

39. *H. pedunculata*, *R. Br. in DC. Syst. Veg.* i. 430. Stems diffuse, prostrate, or rarely erect, much branched, glabrous or clothed as well as the leaves with a few very short spreading hairs. Leaves narrow-linear, rigid, obtuse, usually 2 to 3 lines long, the margins revolute, numerous but not clustered. Peduncles $\frac{1}{4}$ to $\frac{1}{2}$ in. long or sometimes more, the bracts at the base inconspicuous or wanting. Sepals 2 to nearly 3 lines long, ovate, very obtuse, usually minutely pubescent outside. Petals obovate, slightly emarginate. Stamens 15 to 25, accompanied usually by one or two small staminodia outside. Carpels 3, villous (or rarely glabrous?), with 4 or 6 ovules in each.—*Pleurandra intermedia*, *DC. Syst. Veg.* i. 420 (according to an unnamed specimen of *Caley's*, in *Herb. R. Br.*).

N. S. Wales. Port Jackson, *R. Brown*; to the Blue Mountains, *A. Cunningham*. In the mountains and Paramatta, *Caley*; and southward to the lower part of the Australian Alps, *F. Mueller*. These specimens, with elongated, divaricate branches, about 15 stamens and 4 ovules, occur in some herbaria under the name of *H. minutifolia*, *F. Muell.*, as well as those of a var. of *H. serpyllifolia*.

Var. *ericifolia*. Stems short, diffuse or prostrate. Stamens about 20. Ovules usually 6.—*H. corifolia*, *Bot. Mag.* t. 2672; *H. pedunculata*, *Bot. Reg.* t. 1001. The carpels are described in the Botanical Magazine as glabrous, but in the Register, where the same garden-plant is represented, they are said to be silky, as I have always found them.

§ 3. *Ochrolasia*.—Carpels glabrous, with 6 to 8 ovules. No staminodia. Leaves narrow, with revolute margins, as in the *Vestita*. Flowers sessile, without the broad brown bracts of the *Bracteata*.

40. *H. ochrolasia*, *Benth.* Branches rigid, divaricate, glabrous. Leaves linear, obtuse, 2 to 3 lines long, the margins much revolute, rather thick and

rigid, whitish, but without hairs or asperities. Flowers solitary, or 2 or 3 together at the ends of the branches, nearly sessile, surrounded by a few bracts like the sepals, but smaller. Sepals 3 to 4 lines long, densely clothed with long golden hairs. Petals broad. Stamens 15 to 20. Carpels 2.—*Ochroleisia Drummondii*, Turcz. in Bull. Mosc. 1849, ii. 4.

W. Australia. *Drummond*, 4th Coll. n. 119.

§ 4. *Fasciculata*.—Carpels glabrous. Ovules 2 to 6. No staminodia. Leaves narrow-linear, convex below, the margins not recurved. Flowers sessile or nearly so, but without the broad brown bracts of the *Bracteata*.

41. **H. procumbens**, DC. *Syst. Veg.* i. 427. Diffuse or prostrate and much branched, resembling in habit some of the varieties of *H. fasciculata*, with which F. Mueller unites it; but the leaves are broader, the larger ones above $\frac{1}{2}$ in. long and 1 line broad, glabrous or rarely hairy, the flowers much larger, the sepals 4 to 5 lines long, broadly membranous, the stamens at least 20, and the carpels 4 or 5, with almost always 6 ovules in each.—*Dillenia procumbens*, Labill. Pl. Nov. Holl. ii. 16, t. 156; *H. angustifolia*, Salisb. Parad. Lond. under n. 73.

Victoria. Albert river, Gipps' Land, F. Mueller.

Tasmania. R. Brown; abundant in open heathy places, J. D. Hooker.

42. **H. fasciculata**, R. Br. in DC. *Syst. Veg.* i. 428. Stems erect, procumbent or prostrate. Leaves very narrow-linear, clustered and crowded, 2 to 3 lines or rarely $\frac{1}{2}$ in. long, hirsute with soft rather spreading hairs, or at length glabrous, obtuse, or scarcely pointed, the margins never revolute or recurved, but rather turned upwards so as to leave the under surface convex with the prominent midrib. Flowers sessile, on very short leafy shoots along the branches, with 2 or 3 small sepal-like bracts at their base. Sepals 2 to 3 lines long, broadly ovate, membranous at the edge, the outer ones narrower and less obtuse. Petals obovate. Stamens usually 8 to 12, without staminodia. Carpels usually 3, glabrous, with 2 erect ovules in each.—Hook. f. Fl. Tasm. i. 13; *H. angustifolia* (partly), F. Muell. Pl. Vict. i. 18; *H. virgata*, Hook. Ic. Pl. t. 267, not R. Br.; *H. prostrata*, Hook. Journ. Bot. i. 246; *Pleurandra camforosma*, Sieb. in Spreng. Syst. Cur. Post. 191; *H. camphorosma*, A. Gray, Bot. Amer. Expl. Exped. i. 21.

N. S. Wales. Port Jackson, R. Brown, Sieber, n. 146, and Fl. Mirt. n. 506, and others.

Victoria. Port Phillip, R. Brown: sand ridges, heathy ground, and dry, barren places throughout the colony, F. Mueller.

Tasmania. Abundant throughout the colony, ascending to 2000 or 3000 ft., J. D. Hooker.

S. Australia. Extending as far as Spencer's Gulf, F. Mueller and others.

Var. *crassifolia*. Stems prostrate, the habit sometimes nearly that of *H. linearis*, but the margins of the leaves involute not revolute, sometimes very pubescent like the following variety.—*H. glandulosa*, Schlecht. Linnaea, xx. 626. Chiefly in S. Australia.

Var. *pubigera*. Very hoary all over with very short, stiff hairs. Leaves 3 to 6 lines, thicker and less clustered than in the ordinary form. Flowers terminating loosely-leaved branches, but scarcely pedunculate above the last leaf. Flowers as in the common form, except that the sepals are more hairy and the carpels usually 4-ovulate. S. Australia, Atherstone.

The species is said, in Pl. Preiss. ii. 236, to have been found in York district, W. Australia.

I have not seen Preiss's specimen referred to, n. 2171, but should think it very probable that *Candollea teretifolia* may have been mistaken for it.

§ 5. *Bracteata*.—Carpels glabrous. Ovules 1 or 2, erect or ascending. Stamens usually under 20 in the first five species, more numerous in the following ones, without any staminodia. Leaves flat, or when narrow, convex underneath, the margins not prominently revolute. Flowers closely sessile within broad brown shining bracts (except in *H. rostellata*).

13. *H. virgata*, R. Br. in DC. *Syst. Veg.* i. 428. Diffuse or erect, glabrous, with numerous thin but stiff and often wiry branches. Leaves narrow-linear, obtuse or scarcely acute, mostly about $\frac{1}{2}$ in. long, but sometimes much longer, stiff and rather thick, the margins not revolute, and sometimes almost terete. Flowers sessile, surrounded by 2 or 3 very broad scarious pale brown bracts, fully half as long as the calyx. Sepals about 4 lines long, obtuse or more frequently acute, or with a short sharp point, glabrous and more scarious than in any other species. Petals broadly obovate, scarcely emarginate. Stamens 10 to 15, without staminodia. Carpels 3, glabrous, 2-ovulate. —Hook. f. *Fl. Tasm.* i. 14; *H. angustifolia*, var., F. Muell. *Pl. Vict.* i. 19.

N. S. Wales. Port Jackson, R. Brown.

Victoria. Murray river, and near Mount William and Port Phillip, F. Mueller; Mount Lockhart, Moreton.

Tasmania. Sandy soil on the road from George Town to Carrie's River, Gunn.

44. *H. inclusa*, Benth. Allied to *H. virgata*, but much more rigid, the leaves and young branches more or less hoary, and always hirsute, with short white hairs about the floral leaves. Leaves narrow-linear or slightly cuneate, obtuse, $\frac{1}{4}$ to $\frac{1}{2}$ in. long, rather thick, convex underneath, the floral ones clustered. Flowers closely sessile within them, surrounded by short broad brown scarious bracts. Sepals glabrous, about 3 lines long. Petals obovate, entire. Stamens 12 to 15, without staminodia. Carpels 2 or 3, glabrous, 1-ovulate.

W. Australia. Swan River, Drummond, n. 13.

45? *H. rostellata*, Turcz. in Bull. Mosc. 1849, ii. 8. Branches rigid and glabrous. Leaves rigid, thick, narrow-linear, 3 to 4 lines long, hooked at the extremity, with a short recurved sharp point, convex underneath or nearly terete, but marked laterally with a slight furrow indicating the recurved margins which however are not prominent. Flowers nearly sessile. Bracts much smaller and narrower than in any of this group. Sepals glabrous, obtuse, rather above 2 lines long. Stamens 15 to 20, without staminodia. Carpels 5, glabrous, 2-ovulate.

W. Australia. Drummond, *Ath Coll.* n. 121. The position of this species is somewhat doubtful, the foliage is nearly that of *H. recurvifolia* or of *Candollea variegata*, from both of which it widely differs in the stamens. It has not the broad brown bracts of the *Bracteata*, but in other respects comes nearer to them than to any other group.

46. *H. glomerata*, Benth. Rather rigid, much branched and often tortuous, quite glabrous and often rather glaucous, or rarely with a very minute pubescence on the young parts. Leaves from linear-cuneate to oblong or cuneate, obtuse, truncate or retuse, usually $\frac{1}{4}$ to $\frac{1}{2}$ in. long, flat or with the edges slightly recurved, and the midrib prominent underneath, the floral ones

shorter and clustered, sometimes nearly ovate. Flowers rather small, sessile in the tufts of floral leaves, and surrounded by short broad brown scarious bracts. Sepals lanceolate, usually acute, stiffly membranous, quite glabrous, nearly 3 lines long. Petals broadly obcordate. Stamens 10 to 15, or rarely above 20, without staminodia. Carpels 3, glabrous, 1- or 2-ovulate.

W. Australia. Swan River, *Drummond*, 1st Coll. n. 8 of 1843.

Var. *conescens*. Leaves hoary, with a minute appressed pubescence. Sepals larger but glabrous. Gordon river, *Oldfield*; rock at Oolingarra, *Hoch. Moeller*. The specimens are insufficient for accurate determination.

47. **H. argentea**, *Steud. in Pl. Preiss.* i. 268. Allied to *H. montana*, but the whole plant is silvery-white, with densely appressed silky hairs. Leaves narrow-oblong, $\frac{1}{2}$ to $\frac{3}{4}$ in. long, obtuse or with a minute point, slightly contracted at the base. Flowers closely sessile in tufts of floral leaves, and surrounded by broad short bracts, brown on the edges, but more or less silky-hairy on the back, and not so obtuse as in *H. montana*. Flowers smaller. Sepals 3 to 4 lines long, lanceolate, acute, very silky-hairy. Petals broad, emarginate, almost 2-lobed. Stamens above 40, without staminodia. Carpels 3, glabrous, 2-ovulate. Arillus very short.

W. Australia. *Drummond*; Cape Riche, *Preiss.* n. 2144.

Var. *diffusa*. Dwarf, with obovate long leaves of 1 in. or rather more. Flowers large. —Stoney hills, Tone river, *Oldfield*.

48. **H. pilosa**, *Steud. in Pl. Preiss.* i. 272. Branches slender, weak, loosely pubescent or hairy. Leaves narrow-oblong or oblong-oval, above 1 in. long, the margins slightly recurved, nearly glabrous, scarious, or loosely hairy. Flowers closely sessile, surrounded by broad brown scarious bracts, usually mucronate, and shorter and thinner than in *H. montana*. Sepals hairy, with loose spreading not silky hairs, acute, about 3 lines long. Stamens and carpels of *H. montana*, of which this plant may possibly hereafter prove to be a variety only.

W. Australia. Dense shady places, Darling's Range, *Preiss.* n. 2130 (*Hb. Sanderi*).

49. **H. montana**, *Steud. in Pl. Preiss.* i. 270. Stems usually erect, from a thick rhizome, 1 ft. high or rather more, pubescent. Leaves in the normal form linear-oblong, obtuse, with a minute point, $\frac{1}{2}$ to 1 in. long, the margins slightly recurved, narrowed at the base, usually glabrous above, silky-hairy underneath. Flowers closely sessile, and surrounded by 2 or 3 orbicular shining brown bracts. Sepals very densely clothed with long silky hairs, the outer ones acuminate, and often above 5 lines long. Petals obovate, emarginate. Stamens very numerous, without staminodia. Carpels 3, glabrous, 2-ovulate. —*H. discolor* and *H. commutata*, *Steud. in Pl. Preiss.* i. 267.

W. Australia. Hills of Swan River and Canning river, and Darling Range, *Colao*, *Drummond*, *Preiss.* n. 2135, 2136, and 2137, and others.

Var. *confertifolia*. Leaves and flowers smaller. —*H. confertifolia*, *Steud. in Pl. Preiss.* i. 267. King George's Sound and neighbouring districts, *Oldfield*, *Preiss.* n. 2143, and others.

Var. *major*. Larger and more branched and often more or less hirsute, with long spreading hairs. Leaves usually larger, on luxuriant shoots often above $1\frac{1}{2}$ or 2 in. long, broad and coarsely toothed, almost all less contracted at the base than in the normal form, and closely sessile. *H. ovata*, *Steud. in Pl. Preiss.* i. 270. Swan River, *Drummond*; Darling Range, *Preiss.* n. 2134. Some specimens of this variety look so different from *H. montana*, with their coarse habit, long spreading hairs, and broad-toothed leaves, that I had at first retained

them as a distinct species; but they pass into the smaller forms through so many intermediates, that I have been quite unable to draw any definite limits between them.

§ 6. *Subsessiles*.—Carpels glabrous, usually 3, with 1 or 2 ovules in each, but in one species 5 or more, with 6 or more ovules in each. Stamens usually numerous, without staminodia. Leaves flat or the margins slightly recurved. Bracts small or passing into the sepals. Flowers sessile or nearly so.

50. **H. linearis**, *R. Br. in DC. Syst. Veg.* i. 428. Much branched, erect or divaricate, or rarely decumbent, glabrous in all its parts, or with a very minute pubescence on the young shoots. Leaves in the normal forms linear, rather acute or obtuse, with a short recurved point, 4 to 8 lines long, or nearly 1 in. when luxuriant, the margins flat or slightly recurved, and not convex underneath. Flowers on very short peduncles, and usually surrounded by rather longer floral leaves, with small acuminate brown bracts at the base of the peduncle, and one or two at the summit passing into the sepals. Sepals all or the inner ones only obtuse, glabrous with thin margins, $2\frac{1}{2}$ to 3 lines long. Petals obovate, scarcely notched. Stamens 15 to 20, without staminodia. Carpels usually 3, rarely 2 or 1, glabrous, 2-ovulate.

Queensland. Moreton Island, *McGillivray, F. Mueller.*

N. S. Wales. Port Jackson, *R. Brown, Sieber, n. 138*, and *Fl. West. n. 503*, and others; and northward to New England, *C. Stuart.*

Var. floribunda. Sepals more acute and rather hairy. Stamens more numerous.—Peel's Island, *A. Cunningham.*

Var. grandiflora. Sepals above 4 lines long. Stamens about 50. New England, *C. Stuart.*

Var. obtusifolia. More rigid than the normal form, more frequently erect, and more or less hairy, with a minute crisped or shortly stellate tomentum, sometimes densely and softly pubescent, and very rarely glabrous. Leaves from linear to broadly oblong-spathulate, very obtuse or truncate, in some southern specimens above $1\frac{1}{2}$ in. long, and mostly narrowed into a short petiole. Flowers rather larger than in the normal variety, with numerous stamens. *H. obtusifolia*, *DC. Syst. Veg.* i. 429. *H. canescens*, *Sieb. in Spreng. Syst. Cur. Post.* 211.

Queensland. Brisbane and Burnett rivers, *F. Mueller.*

N. S. Wales. Port Jackson, *Sieber, n. 140*; Twofold Bay, *F. Mueller*; and other places south of Sydney, *A. Cunningham.*

Victoria. Godburn river, towards the Dandenong ranges, and on the northern slopes of the Australian Alps, *F. Mueller*; also in *Mitchell's* collections. The majority of specimens of this variety have a very different aspect from those of the typical *H. linearis*; but as there are certainly numerous intermediates, I feel compelled to follow *F. Mueller* in uniting them as varieties. He also includes in the same species the following *H. diffusa*, which, however, appears to me to be rather more constant in its characters. The specimens described by *De Caudolle* were from Port Jackson, not from Van Diemen's Land.

51. **H. diffusa**, *R. Br. in DC. Syst. Veg.* i. 429. Stems low, usually diffuse or prostrate, with numerous short ascending branches, pubescent or at length glabrous. Leaves from obovate to linear-cuneate, very obtuse or truncate, seldom above $\frac{1}{2}$ in. long, and then often 2- or 3-toothed. Peduncles very short. Sepals broadly oblong, obtuse, about 4 lines long, the outer ones rather shorter and narrower. Petals obovate, entire. Stamens about 20 to 25, without staminodia. Carpels usually 3, or rarely 2 or 4, glabrous, 2-ovulate.

N. S. Wales. Port Jackson, *R. Brown, Sieber, n. 145*, and *Fl. West. n. 501*, and others.



Warburtonia

potentillina.

Warburtonia

Warburtonia potentillina. FM.

Var. *dilatata*. More erect and very much branched. Leaves small, broadly spatulate, and much contracted at the base, with a petiole even longer than the blade. Carpels 1, 2, or 3.—*H. monogyna*, R. Br. in DC. Syst. Veg. i. 429; *H. dilatata*, A. Cunn. Herb.—Port Jackson, R. Brown and others; and southward to Yowaka river, F. Mueller.

52. **H. saligna**, R. Br. in DC. Syst. Veg. i. 427. Branches elongated, flexuose, apparently diffuse or half trailing, softly pubescent when young. Leaves oblong-linear or lanceolate, usually shortly pointed, $1\frac{1}{2}$ to 3 in. long, narrowed below, with a broader stem-clasping base, leaving a raised ring on the branch, glabrous or nearly so above, loosely villous underneath. Flowers sessile in a cluster of floral leaves. Sepals oval-oblong, 6 to 8 lines long, the inner ones obtuse, the outer ones more lanceolate and pointed, very silky-hairy outside. Petals broadly obovate, scarcely notched. Stamens 20 to 30, without staminodia. Carpels 3, glabrous, 2-ovulate.

N. S. Wales. Port Jackson, R. Brown and others; to the Blue Mountains, A. Cunningham, Miss Atkinson, and others.

53. **H. volubilis**, Andr. Bot. Rep. t. 126. Stems woody, short and trailing, or twining and climbing to the height of 2 to 4 ft., the young parts more or less clothed with silky hairs. Leaves from obovate to lanceolate, obtuse or acute, $1\frac{1}{2}$ to 3 in. long, narrowed below, but slightly enlarged and stem-clasping at the base, leaving a raised ring on the stem, as in most *Candolleas*, glabrous above, silky-hairy underneath. Flowers the largest of the genus, nearly sessile, the upper leaves passing into sepal-like bracts. Sepals 8 lines to 1 in. long, ovate-acuminate, very silky-hairy outside. Petals obovate, entire. Stamens very numerous, without staminodia. Carpels usually 5, but sometimes up to 8, glabrous, 6- to 8-ovulate. *Dillenia scandens*, Willd. Spec. ii. 1251; *Dillenia volubilis*, Vent. Choix, t. 11; *D. speciosa*, Bot. Mag. t. 449, not of Thunb.

Queensland. Loose sand and sides of rocks near the sea, Moreton Island, W. Gillivray, F. Mueller.

N. S. Wales. N. shore, Port Jackson, R. Brown and others; Kiama, Harvey; Hastings river, Beckler; Paramatta, Woolls.

§ 7. *Hemihibbertiæ*.—Carpels glabrous, except in *H. grossulariæfolia* and *H. lasiopus*. Stamens very numerous, with several, often numerous, small subulate or clavate staminodia round the outside. Leaves flat. Flowers pedunculate.

54. **H. grossulariæfolia**, Salisb. Parad. Lond. t. 73 (*Burtonia* on the plate). Stems weak and prostrate or trailing, loosely pubescent. Leaves distinctly petiolate, ovate or oval-oblong, obtuse, 1 to $1\frac{1}{2}$ in. long, undulate and coarsely toothed, prominently pinnate-veined underneath, glabrous or scabrous above, more or less pubescent or hairy underneath. Flowers rather small, on filiform peduncles of 1 in. or more, with 2 or 3 narrow bracts at their base. Sepals ovate or lanceolate, acuminate, about 3 lines long, silky-hairy. Petals obovate, entire or nearly so. Stamens numerous, with several filiform or clavate staminodia outside; anthers short but oblong. Carpels 10 to 15, villous, 2-ovulate.—Bot. Mag. t. 1218; DC. Syst. Veg. i. 425; Reichb. Ic. et Deser. Pl. t. 74; *H. crenata*, Andr. Bot. Rep. t. 172; *H. latifolia*, Steud. in Pl. Preiss. i. 269; *Warburtonia potentillina*, F. Muell. Fragm. i. 230. t. 9; ii. 182.

W. Australia. Sandy and rocky places near the sea King George's Sound, *R. Brown*, *Menzies*; Swan River, *Collie*, *Drummond*, *Preiss*, n. 2126; Cape Naturaliste, *Oldfield*.

55. **H. dentata**, *R. Br. in DC. Syst. Vég.* i. 426. Stems woody at the base only, trailing or twining, glabrous or the young branches pubescent. Leaves distinctly petiolate, oblong, obtuse or acute, $1\frac{1}{2}$ to $2\frac{1}{2}$ in. long, flat, marked with a few distant callous teeth, or slightly sinuate, rounded at the base, glabrous or pubescent when young. Flowers rather large, on short peduncles, with 1 or 2 small bracts at their base. Sepals ovate, $\frac{1}{2}$ in. long, the inner ones obtuse, the outer rather shorter and more acute, rarely all acuminate, pubescent or silky-hairy. Petals obovate, entire or scarcely notched. Stamens very numerous with slender filaments, the anthers short, although not so broad as in the *Brachyantheræ*, and a considerable number of filiform or clavate staminodia outside. Carpels 3, glabrous, 6- to 8-ovulate.—*F. Muell. Pl. Vict.* i. 217; *Bot. Reg.* t. 282; *Bot. Mag.* t. 2338.

N. S. Wales. Woods and stony places near the sea, Port Jackson, *R. Brown*, *Caley*, and others; northward to Hastings and Clarence rivers, *Beckler*; and southward to Illawarra, *A. Cunningham*; and Twofold Bay, *F. Mueller*.

Victoria. Stony forest declivities, near the Genoa river, Genoa Peak, and other localities at the S. E. limit of Gipps' Land, *F. Mueller*.

56. **H. perfoliata**, *Endl. in Hueg. Enum.* 3. Stems weak, procumbent, ascending or shortly erect, or sometimes shortly trailing, quite glabrous as well as the whole plant. Leaves ovate, acute, 1 to 2 in. long, often edged with minute distant teeth, perfoliate near the base, the auricles quite united behind the stem. Peduncles 1 to 2 in. long. Sepals lanceolate, acute or acuminate, 4 to 5 lines long. Petals obovate, entire. Stamens numerous, with a few short filiform staminodia outside. Carpels 3, 4, or 5, glabrous.—*Bot. Reg.* 1843, t. 64.

W. Australia. Marshes, Swan River, *Huagel*; Freemantle, *Collie*; shady boggy places, about Perth, *Preiss*, n. 2127; Vasse river, *Oldfield*; King George's Sound, *A. Cunningham*.

57. **H. bracteosa**, *Turcz. in Bull. Mosc.* 1852, ii. 140. Stems erect, somewhat compressed, with 2 prominent angles, 1 to $1\frac{1}{2}$ ft. high, glabrous like the whole plant. Leaves broadly obovate, very obtuse, 1 to 2 in. long, closely clasping the stem at their base, the auricles slightly decurrent or projecting beyond the stem. Peduncles leaf-opposed or axillary, 1 in. long or more. Flowers large. Sepals ovate, 5 to 6 lines long, the inner ones obtuse, the outer more acute. Petals very broadly obovate. Stamens very numerous, with a few filiform staminodia outside. Carpels 5, glabrous, 3- or 4-ovulate.

W. Australia. *Drummond*, n. 286; Plantagenet, Stirling, Perongerup ranges, *Maxwell*.

58. **H. amplexicaulis**, *Steud. in Pl. Preiss.* i. 266. Perfectly glabrous like the last two, with ascending or perhaps half-trailing stems of 1 to 2 ft. Leaves broadly lanceolate or oblong, acute, 2 to 3 in. long, embracing the stem by two ovate auricles, quite free or occasionally united beyond the stem. Peduncles flexuose, 1 to 2 in. long. Flowers rather large. Sepals fully 6 lines, ovate-lanceolate, and very acute in the original specimens, broader and very obtuse in many others. Petals broadly obovate, entire or slightly

notched. Stamens very numerous, with a few filiform staminodia outside. Carpels 4 or 5, glabrous, 4-ovulate.

W. Australia. King George's Sound, *Menzies*; and thence to Vasse and Swan rivers, *Drummond*, *Preiss*, n. 2129, *Oldfield*, and others.

Some specimens have the margins of the lower leaves more or less united, thus showing an approach to *H. perfoliata*, and have been described as species under the names of *H. bipleurifolia*, *Lehm.* Nov. Hort. Hamb. and *Linnæa*, xvi. 307, and of *H. disticha*, *Lehm.* l.c. 309. They may be readily distinguished from *H. perfoliata*, by the thicker rigid pedicels, larger broader sepals, &c. On the other hand, narrow-leaved branches appear almost to pass into *H. Cunninghamii*.

59. **H. Cunninghamii**, *Hook. Bot. Mag.* t. 3183. Perfectly glabrous, with slender branches apparently tending to climb. Leaves linear, mostly pointed, 1 to $1\frac{1}{2}$ or rarely 2 in. long, the edges scarcely recurved, narrowed below the middle, but expanded again into a stem-clasping or sagittate base. Peduncles axillary, $\frac{1}{2}$ to $\frac{3}{4}$ in. long, with a few small leafy bracts at their base. Sepals thin, about 3 lines long, broadly ovate, the outer ones more acute. Petals slightly notched. Stamens numerous, with numerous short filiform staminodia outside. Carpels 5, glabrous, 3- or 4-ovulate.—*Candollea Cunninghamii*, *Benth.* in *Maunder. Bot.* ii. t. 83; *Hibbertia lactucifolia*, *Stend.* in *Pl. Preiss.* i. 267.

W. Australia. King George's Sound, *R. Brown*, *A. Cunningham*, and others; Cape Riche, *Hunter*; shady places, Sussex and Plantagenet districts, *Preiss*, n. 2161 and 2173; *Stirling range*, *Maxwell*; Cape Naturaliste, *Oldfield*.

Var. *hastata*. Leaves rather broader, the broadest nearly 3 lines, and carpels, according to *Stendel*, 2 only. I have only seen fragments.—*H. hastata*, *Stend.* in *Pl. Preiss.* i. 266.—*S. W. Australia*, *Preiss*, n. 2128.

60. **H. glaberrima**, *P. Muell. Fragm.* iii. 1. Perfectly glabrous. Leaves (the upper ones only known) oblong-lanceolate, obtuse with a short glandular point, 1 to $1\frac{1}{2}$ in. long, quite entire, tapering below the middle almost into a petiole, and slightly expanded so as to half-clasp the branch. Peduncles axillary or terminal, about $1\frac{1}{2}$ in. long. Innermost sepals fully 6 to 7 lines long, and very broad, the others gradually diminishing to the outermost, which is lanceolate and about 3 lines. Petals not much longer than the calyx. Stamens very numerous (200 to 300), with numerous (2 or 3 dozen) short clavate staminodia outside. Carpels 3, glabrous, with about 8 ovules in each.

S. Australia. In the interior at Brinkley's Bluff, near Macdonnell's Range, *M'Donnell Stuart*. Evidently nearly allied to *H. amplexicaules*, but without the basal articles of the leaf.

61. **H. Mylnei**, *Benth.* Resembles, at first sight, some of the hairy varieties of *H. montana*, but the flowers are different. Stems in our specimens short and erect from a thick rhizome, hispid as well as the leaves with long spreading or reflexed hairs. Leaves oblong, obtuse, or shortly pointed, mostly about 1 in. long, slightly contracted, and half stem-clasping at the base, the margins scarcely recurved. Flowers closely sessile in a cluster of smaller floral leaves, and surrounded by brown scarious bracts as in *H. montana*, but the sepals (5 or 6 lines long) are glabrous, the petals almost 2-lobed, and the numerous stamens, with slender filaments and short anthers, are surrounded by small, filiform or slightly clavate staminodia. Carpels 3, glabrous, 2-ovulate.

W. Australia. Swan River, *Mylne*.

62. **H. lasiopus**, *Benth.* Stems usually rather short, with a short pubescence, mixed with long spreading hairs, in our specimens nearly simple and erect from a thick rhizome. Leaves from obovate to oblong, 1 to 2 in. long, or rather more, the larger ones often coarsely toothed and more or less hairy, the younger ones often deeply toothed, narrowed but half-stem-clasping at the base. Flowers on very hairy peduncles of $\frac{1}{2}$ to $1\frac{1}{2}$ in., surrounded at the base by broad brown scarious bracts. Sepals very densely silky-hairy, $\frac{1}{2}$ in. long, acuminate. Petals broadly obovate, deeply notched. Stamens very numerous, with a ring of filiform or clavate staminodia outside. Carpels 5, very villous, 2-ovulate.

W. Australia. Swan River, *Drummond, Mylne*.

63. **H. potentillæflora**, *F. Muell. Herb.* Stems either nearly simple, erect, from a thick rhizome, and $\frac{1}{2}$ to 1 foot high, or longer, and branched, hoary, with a short, close, somewhat silky pubescence. Leaves oblong-linear or lanceolate, usually obtuse, 1 to 2 in. long, the margins flat or slightly recurved, silky-hairy on both sides when young, but nearly glabrous above when old, narrowed below, and scarcely stem-clasping. Peduncles clustered, or rarely solitary, silky-hairy, 1 to $1\frac{1}{2}$ in. long, surrounded at the base by broad brown scarious bracts. Sepals silky-hairy, ovate, rather acute, about 5 lines long, with membranous edges. Petals obovate, retuse, stamens very numerous, more or less clustered between the carpels, but free, with a considerable number of subulate staminodia outside. Anthers oval-oblong, opening laterally. Carpels 5, glabrous, 2-ovulate.

W. Australia. Swan River, *Drummond, 1st Coll.*; Murchison River, *Oldfield*.

§ 8. *Brachyantheræ*.—Carpels glabrous. Stamens about 15 to 20, without staminodia. Anthers (except in *H. pungens*) ovate or orbicular, flattened, with the cells opening on the inner face. Leaves narrow-linear, glabrous. Flowers pedunculate.

64. **H. pungens**, *Benth.* Glabrous and rigid with the pungent leaves of *H. acicularis* and *H. acerosa*, but very different stamens. Leaves narrow-linear, or linear-subulate, often fasciculate, the longest about $\frac{1}{2}$ in. long, very rigid, with a fine pungent point. Peduncles shorter than the leaves, recurved. Sepals about 2 lines long, broad, obtuse, or the outer ones with a short, fine point, quite glabrous. Carpels 5, glabrous, 2-ovulate. Stamens about 15, without staminodia. Anthers oblong.

W. Australia. E. Mount Barren and Phillip's River, *Maxwell (Hb. F. Muell.)*.

65. **H. nutans**, *Benth.* Branches rigid, rather wiry, and erect from a thick rhizome, the young ones ash-coloured, but glabrous. Leaves rigid, linear, with a short recurved point, mostly about $\frac{1}{2}$ in. long, the margins slightly recurved, the midrib underneath very thick, whitish, but glabrous. Peduncles recurved, about $\frac{1}{2}$ in. long. Sepals 5 to 6 lines, glabrous, the inner ones with membranous edges. Petals not seen. Stamens about 20, without staminodia. Anthers ovate, flat, opening inwards, the connective ending in an obtuse, prominent point. Carpels 5, glabrous, 2-ovulate.

W. Australia. Swan River, *Drummond, Coll. 1843, n. 10*.

66. **H. leptopus**, *Benth.* Glabrous and slender, like *H. stellaris*, but stiffer and less branched, and the branches usually ashy-white. Leaves narrow-linear, obtuse, or nearly so, $\frac{1}{2}$ to $1\frac{1}{2}$ in. long, the edges so revolute as to make them nearly terete. Pedicels very slender, usually about $\frac{1}{2}$ in. long. Flowers of *H. stellaris*, but smaller, the sepals more herbaceous. Anthers nearly orbicular, and very concave on the inner face. Carpels of *H. stellaris*.

W. Australia. Swan River, *Drummond*, n. 11.

67. **H. stellaris**, *Endl. in Haeg. Enum.* 3. Glabrous, with numerous slender branches. Leaves linear, flat, acute, and somewhat falcate, mostly about 1 in. long, narrowed below the middle, the floral ones often slightly enlarged and sheathing, or stem-clasping at the base. Flowers numerous, on slender peduncles of $\frac{1}{2}$ to $\frac{3}{4}$ in. Sepals orbicular, membranous, very obtuse, about 2 lines long. Petals nearly twice as long, broad, deeply notched and more persistent than in most species. Stamens about 15, without staminodia, the anthers short, broad, and flattened, turned over the ovaries, and opening on the inner face. Carpels 3, very truncate, glabrous, 1- or 2-ovulate.—*H. tenuiramea*, *Steud. in Pl. Preiss.* i. 268.

W. Australia. Sandy places, Swan River, *Hugel, Preiss.* n. 2145; from Geographer Bay and Gordon river to Murchison river, *Maxwell, Oldfield*, and others.

3. CANDOLLEA, Labill.

Sepals 5. Petals 5. Stamens united to the middle or higher up, into five bundles, each bearing 2 to 6 anthers, and alternating with the carpels when there are five carpels, or when the carpels are reduced to 3 or 2, 2 or 3 of the bundles are often reduced to a single stamen, and in some species there is a free stamen within each bundle. No staminodia. Carpels usually 3 or 5, very rarely reduced to 2, always glabrous, with 1, 2, or very rarely 3 ovules in each. Styles and fruit of *Hibbertia*.—Shrubs or undershrubs with the habit of *Hibbertia*.

All the known species are from West Australia.

Flowers sessile within the floral leaves.

Leaves with flat, or slightly recurved, not revolute margins.

Leaves obovate or oblong. Carpels 5, 2- or 3-ovulate.

Leaves obovate or shortly obovate-cuneate. Petals slightly exceeding the calyx

Leaves narrow-oblong, 1 to 2 in. Petals much longer than the calyx, deeply notched

Leaves linear or subulate. Carpels 3 to 5, 1-ovulate.

Leaves linear-cuneate, enlarged at the base into a broad sheath

Leaves linear, slightly dilated at the base, obtuse or truncate, $\frac{3}{4}$ to 1 in. Carpels 5, rarely 3

Leaves heathlike, clustered, mostly 2 to 4 lines. Carpels 3

Leaves linear, with revolute margins

Leaves heathlike, glabrous, mostly 2 to 4 lines. Flowers small. Sepals glabrous

Leaves clustered, mostly $\frac{1}{2}$ in., the floral ones and sepals hairy. Carpels 3.

Stem shrubby. Leaves rigid, the floral ones long, glabrous at the tips

1. *C. cuneiformis*.

2. *C. tetrandra*.

10. *C. glaberrima*.

3. *C. glomerosa*.

4. *C. loretifolia*.

4. *C. teretifolia*.

5. *C. desmophylla*.

- Stem half herbaceous. Leaves very hirsute, the floral
 ones not exceeding the flowers 6. *C. helianthemoides*.
 Carpels 5. Stem half herbaceous 7. *C. fasciculata*.
 Leaves mostly 1 to 2 in. long and scarcely clustered.
 Glabrous. Leaves rigid, mostly acute. Staminal bundles of
 about 5 8. *C. Huegelii*.
 Silky-hairy. Leaves less rigid, more obtuse. Staminal
 bundles of 2 or 3 each 9. *C. pachyrrhiza*.
 Flowers pedunculate.
 Peduncles shorter than the enlarged sheaths of the floral leaves.
 Leaves flat, obtuse, or truncate.
 Blade of the floral leaves longer than their sheaths 10. *C. glaberrima*.
 Sheaths of the floral leaves $\frac{1}{2}$ in., with the blade reduced to a
 short point 11. *C. vaginata*.
 Peduncles longer than the sheaths of the floral leaves. Leaves
 flat or the margins scarcely recurved, obtuse or truncate.
 Plant very glaucous. Leaves thick, broadly linear, mostly
 above 1 in. Peduncles tomentose, scarcely longer than the
 flowers 12. *C. Preissiana*.
 Plant slightly glaucous. Leaves narrow, $\frac{1}{2}$ to 1 in. Peduncles
 long, slender, glabrous 13. *C. pedunculata*.
 Peduncles short. Leaves narrow-linear, rigid, thick, without
 sheaths.
 Leaves with a straight pungent point 14. *C. exasperata*.
 Leaves recurved at the top 15. *C. uncinata*.

1. ***C. cuneiformis***, Labill. *Pl. Nov. Holl.* ii. 34, t. 176. An erect shrub, attaining sometimes above a man's height, but often much lower, with numerous short, crowded branches, the young ones slightly hairy. Leaves from oblong-cuneate to obovate, obtuse, truncate, or with a few teeth at the top, seldom above 1 in. long, flat, narrowed into a short stem-clasping petiole, leaving a prominent ring on the branch. Flowers sessile among the crowded floral leaves. Sepals ovate-oblong, the 2 outer ones thick, about $\frac{1}{2}$ in. long, the inner shorter, thinner, and broader. Petals rather longer, broad, and deeply notched. Stamens in 5 bunches of 3 to 5 each, with one free one within each bunch. Carpels 5, glabrous, 2-ovulate. Arillus more than half as long as the seed.—Bot. Mag. t. 2711; *Hibbertia obconata*, Salisb. *Parad. Lond.* under n. 73.

W. Australia. King George's Sound, *R. Brown* and others; Point Possession, *Collin*; Champion Bay, *Bower*; Geographer Bay and Bald Island, *Oldfield*.

2. ***C. tetrandra***, Lindl. *Bot. Reg.* 1842, *Misc.* 39, and 1843, t. 50. Branches elongated, angular, shortly pubescent. Leaves from narrow-oblong to oblong-obovate, obtuse, or shortly acuminate, but not truncate, 1 to 2½ in. long, the larger ones obscurely or coarsely toothed, narrowed at the base, and stem-clasping, as in *C. cuneiformis*. Flowers as in that species, but larger, the outer almost acute sepals often 8 lines, and the petals fully 1 in. Stamens of *C. cuneiformis*. Carpels 5, glabrous, with 2 or rarely 3 ovules in each. Ripe carpels black, and somewhat fleshy. Seeds more or less enveloped in an orange-coloured lobed arillus.—*C. latifolia*, Steud. in *Pl. Preiss.* i. 273.

W. Australia. Swan River, *Drummond*, *Coll.* 1843, n. 6; shady places, Port Leschenault, *Preiss.* n. 2162.

C. calycina, Steud. in *Pl. Preiss.* i. 274, from Port Leschenault and Sussex district, *Preiss.* n. 2131, appears to be the same species, although the petals are said to be smaller.

The specimens I have seen are bad, and the petals shrivelled or fallen off, the carpels nearly ripe.

3. **C. glomerosa**, *Benth.* Stems virgate, usually glabrous, except about the floral leaves. Leaves linear, obtuse, or truncate, mostly $\frac{3}{4}$ to 1 in. long, glabrous, the margins flat or recurved, but not revolute, narrowed below the middle, and slightly enlarged and stem-clasping at the base. Flowers nearly or quite sessile, usually surrounded by 2 or 3 ovate glabrous bracts, sometimes passing into the sepals. Calyx clothed with long, silky, or woolly hairs, or sometimes quite glabrous, the outer sepals ovate-lanceolate, acute, 3 to 4 lines long, the inner broad and more obtuse. Petals broad, notched. Stamens in 5 bundles of 4 to 6 each, often with a free one inside. Carpels 5, glabrous, 1-ovulate. Seeds brown, with a short, entire, or lobed arillus.

W. Australia. Swan River, *Drummond*; Port Gregory, *Oldfield*.

Var. *subsericea*. More silky; stamens fewer, two of the clusters reduced to single stamens, and carpels 3 only.—Swan River, *Drummond*.

4. **C. teretifolia**, *Turez. in Bull. Mosc.* 1849, ii. 7. Perfectly glabrous. Branches slender, erect, virgate. Leaves heath-like, often clustered, linear, semiterete, slender, and rather acute, usually 2 or 3 lines, but in some specimens $\frac{1}{2}$ in. long, the margins scarcely or not at all revolute. Flowers small, sessile in the clusters of leaves. Sepals ovate, membranous, coloured, scarcely 2 lines long, with 2 or 3 short orbicular bracts. Petals broadly obovate, entire. Stamens in 3 clusters of about 3 each, often less united than in most *Candolleas*, and 2 single stamens. Carpels 3, glabrous, 1-ovulate. The general aspect is very much that of the small glabrous-leaved specimens of *Hibbertia fasciculata*, but the stamens and ovaries are very different.—*Pleurandra enervia*, DC. Syst. Veg. i. 421 $\frac{1}{2}$; Steud. in Pl. Preiss. i. 264; *P. hemignosta* and *P. hibbertioides*, Steud. l. c. i. 265.

W. Australia. King George's Sound, *Harvey, Oldfield*; ironstone gravel of the Darling Hills, *Drummond*, 1st Coll., also 2nd Coll., n. 124; sandy places, Plant. erect district, and along places on the N. side of Mount Bakewell, *Preiss*, n. 2153, 2163, 2164, and 2172; and eastward to Phillips river, *Macw. H.* I have been unable to find authentic specimens of the plant described by De Candolle in the Lambertian Herbarium, now dispersed.

In one specimen from the East River flats, Stokes' Inlet, *Macw.*, the leaves are not so slender, very obtuse or recurved at the top, and grooved underneath by the slightly recurved margins, but the flowers are precisely the same.

5. **C. desmophylla**, *Benth.* Stems rigid, divaricately branched, glabrous, or the young ones loosely pubescent. Leaves densely clustered, linear, obtuse, mostly about $\frac{1}{2}$ in. long, the margins closely revolute, rather dilated at the base, clothed with long, loose, spreading hairs, to about the middle, glabrous, smooth, and almost terete above. Flowers sessile in the clusters, much shorter than all except the innermost leaves, and immediately surrounded by a few imbricate membranous bracts, with brown tips, passing into similar but longer sepals, of which the innermost are $2\frac{1}{2}$ lines long and scarious, without the brown tips. Petals obovate, obtuse. Stamens in 3 bundles of 3 or 4 each, and 2 single ones. Carpels 3, glabrous, 1-ovulate.

W. Australia. *Drummond*; Murchison river, *Oldfield*.

6. **C. helianthemoides**, *Turez. in Bull. Mosc.* 1849, ii. 8. Stem

erect or procumbent, rather slender, and apparently half herbaceous, about 1 foot long, the branches clustered or dichotomous, the young ones as well as the leaves softly hairy. Leaves usually clustered, linear or linear-lanceolate, obtuse, 4 to 8 lines long, the margins rather thick and revolute. Flowers sessile within the clusters of leaves, the bracts at their base small, or none. Sepals oblong, obtuse, about $2\frac{1}{2}$ lines long, membranous and coloured. Petals broadly 2-lobed, narrowed into a claw. Stamens in 5 bundles, of which usually 3 have 3 or 4 each, and 2 have only 2 each. Carpels 3, glabrous, 1-ovulate.

W. Australia. *Drummond, 4th Coll. n. 118.*

7. **C. fasciculata**, *R. Br. in DC. Syst. Veg.* i. 424. Stems procumbent, half herbaceous, loosely clothed as well as the leaves with silky or almost woolly hairs, which wear off with age. Leaves clustered below the branches and about the flowers, distant on the branches, linear, obtuse, $\frac{1}{2}$ to 1 in. long, or much shorter on the smaller branches, all with the margins revolute. Flowers sessile in the clusters of leaves, which are all longer than them, except a few of the innermost. Sepals membranous, about 3 lines long, slightly hairy, the outer ones acute, the inner ones less so. Stamens in 5 bundles, usually of 3 each, without free inner ones. Carpels 5, glabrous, 1-ovulate.—*Hibbertia depressa*, Steud. in Pl. Preiss. i. 263; *C. kochioides*, Turcz. in Bull. Mosc. 1849, ii. 7 (from the description given).

W. Australia. King George's Sound, *R. Brown* and others; in woody places, *Myrtles*; sandy hills near Albany, *Preiss, n. 2153.*

8. **C. Huegelii**, *Endl. in Hueg. Enum.* 2. Branches stiff, but often elongated, glabrous and shining, or shortly villous about the floral leaves. Leaves narrow-linear, with the margins so closely revolute as to appear almost terete, acute, but frequently broken off at the ends so as to appear truncate, 1 to 2 in. long, or even more on vigorous shoots, the floral ones dilated and stem-clasping at the base. Flowers nearly sessile in clusters of floral leaves, with small lanceolate acuminate bracts at their base. Sepals fully $\frac{1}{2}$ in. long, ovate-acuminate, usually pubescent outside. Petals narrow-obovate, entire, or nearly so. Stamens in 5 bundles of about 5 each, with one free one inside each bundle. Carpels 5, or very rarely 4, glabrous, 1-ovulate.—*C. striata*, Steud. in Pl. Preiss. i. 275.

W. Australia. Swan River, *Drummond* and others; in sandy places near Perth, *Preiss, n. 2148*; between Perth and King George's Sound, *Harvey*.—I have not seen Huegel's original specimen, but have no doubt of the identity of the species.

9. **C. pachyrrhiza**, *Benth.* Nearly allied to *C. Huegelii*, and possibly a variety only, the stems are more erect, apparently arising from a thick rhizome, and more or less silky-hairy, as well as the leaves. Leaves usually shorter and more obtuse, yet still exceeding 1 in. and nearly terete. Flowers similar to those of *C. Huegelii*, but smaller, and with fewer stamens, there being usually only 2 or 3 to each bundle, and the inner free ones often deficient.—*Hibbertia pachyrrhiza*, Steud. in Pl. Preiss. i. 269; *H. basitricha*, Steud. l. c. 268.

W. Australia. Swan River, *Drummond*; between Perth and King George's Sound, *Harvey*; sandy and stony places, Darling Range, *Preiss, n. 2149 and 2165.*

10. **C. glaberrima**, *Steud. in Pl. Preiss. i. 274.* Apparently procumbent, much branched and somewhat glaucous, either quite glabrous or slightly pubescent on the smaller shoots. Leaves linear or linear-cuneate, obtuse with a small point, $\frac{1}{2}$ to 1 in. long, or rather more, suddenly enlarged at the base into a stem-clasping sheath 2 to 3 lines long, leaving a ring round the stem when they fall off. Pedicels included in the sheath, with 2 or 3 lanceolate bracts at their base. Sepals lanceolate, acute, 4 to 5 lines long, more distinctly united than in most species into a short tube at the base, quite glabrous, keeled, membranous on the edges. Petals narrow-obovate, entire. Stamens in 3 bundles of 2 or 3 each, and 2 single ones. Carpels 3, glabrous, 1-ovulate.—*C. subraginata*, *Steud. in Pl. Preiss. i. 275*; *C. rupestris*, *Steud. l. c.* (sheaths of the floral leaves rather shorter).

W. Australia. Swan River, *Drummond*; sandy, shrubby, and woody places, Perth district, *Preiss. n. 2157*; Hay district, *n. 2160*; and clefts of rocks of Darling Range, *n. 2158*.

11. **C. vaginata**, *Benth.* Stems numerous, erect from a thick rhizome, and but little branched, the whole plant glaucous and glabrous, except a slight pubescence on the flowering shoots. Lower leaves linear or linear-lanceolate, acute, 1 to 2 in. long, narrowed below the middle, and scarcely enlarged at the base, the floral ones very much enlarged and sheathing below, the upper ones reduced to broad loose acute sheaths of about $\frac{1}{2}$ in. Pedicels very short and included in the sheaths, bearing a few minute bracts, and a larger one under the flower. Sepals glabrous, ovate or ovate-lanceolate, about 3 lines long. Petals obovate, acute. Stamens in 3 or rarely 2 bundles of 2 or 3 each, and 2 or rarely 3 single ones. Carpels 3, glabrous, 1-ovulate.

W. Australia. Swan River, *Drummond*.

12. **C. Preissiana**, *Steud. in Pl. Preiss. i. 274.* Much branched, and more or less glaucous and glabrous, or with a slight down or woolly hairs at the base of the floral leaves. Leaves linear-oblong or linear-cuneate, obtuse with a short point, or more frequently truncate or 3-toothed, $\frac{3}{4}$ to $1\frac{1}{2}$ in. long, and mostly $1\frac{1}{2}$ to 2 lines broad, rather thick, flat, narrowed below the middle, but mostly, especially the floral ones, again dilated and stem-clasping at the base, leaving a prominent ring. Flowers irregularly clustered in the upper axils, on pedicels of 2 to 5 lines. Sepals 3 to 4 lines long, thin and yellow especially on the edges, the inner ones acute, the inner obtuse and petal-like. Petals narrow-obovate, slightly notched. Stamens in 3 or 2 bundles of about 3 each, and 2 or 3 single ones. Carpels 3, glabrous, 1-ovulate.

W. Australia. *Borges*; maritime rocks, Perth district, *Preiss. n. 2159 b*; Port Gregory, *Oldfield*. This may probably prove to be a variety of *C. pedunculata*.

13. **C. pedunculata**, *R. Br. in DC. Syst. Veg. i. 424.* Stems usually rather weak, branching, erect or ascending from a thick rhizome to about a foot, but sometimes more rigid with short branches; glabrous, except a few hairs about the floral leaves. Leaves linear or linear-cuneate, obtuse, truncate or emarginate, $\frac{1}{2}$ to $1\frac{1}{2}$ in. long, the margins recurved, narrowed below, with a broader stem-clasping or sheathing base, leaving a raised ring round the stem, glabrous and in the larger specimens somewhat glaucous. Peduncles usually clustered with small leaves in the upper axils, slender, $\frac{1}{4}$ to $\frac{1}{2}$ in.

long, forming a kind of leafy raceme. Sepals about 2 lines long, obtuse, or the outer ones acute, glabrous, membranous on the edge. Petals clawed, obovate-oblong, entire. Stamens in 3 or 4 bundles of 3 or 4, with 2 or 1 single. Carpels 3 or 4, glabrous, 1-ovulate.—*C. racemosa*, Endl. in Hueg. Enam. 2; *C. tridentata*, Turcz. in Bull. Mosc. 1849, ii. 140; *C. assimilis*, Steud. in Pl. Preiss. i. 273; *C. parviflora*, Steud. l. c. i. 276; *Hibbertia subexcisa*, Steud. in Pl. Preiss. i. 269.

W. Australia. King George's Sound, R. Brown and others; Swan River, Drummond, 5th Coll. n. 288, Oldfield; sands near Perth, Preiss, n. 2133 b, 2146, and 2150; and northwards to Murchison river, Oldfield.

14. **C. exasperata**, Steud. in Pl. Preiss. i. 276. Rigid, much branched and glabrous. Leaves narrow-linear, thick and rigid, pointed and almost pungent, about $\frac{1}{2}$ in. long, slightly hoary or scabrous, but glabrous, the recurved margins slightly indicated by two striae underneath. Peduncles 1 to 2 lines long, erect, with small bracts at their base, and a large sepal-like one under the calyx. Sepals broad, obtuse, stiff, and dry, the inner ones nearly 4 lines, the outer shorter and often slightly hoary on the bud. Petals obovate, rather narrow, notched. Stamens scarcely united above the middle in 5 bundles of 3 or sometimes 2 each, without single ones. Carpels 5, glabrous, 2-ovulate.—*Hibbertia squamosa*, Turcz. in Bull. Mosc. 1849, ii. 9.

W. Australia. Swan River, Drummond, 4th Coll. n. 122; Roe; gravelly places, Quanyan Plains, Victoria district, Preiss, n. 2175. The foliage is nearly that of *Hibbertia mucronata*.

15. **C. uncinata**, Benth. Rigid, much branched and glabrous. Leaves narrow-linear, rigid, recurved upwards and obtuse, or with a minute reflexed point, 2 to 4 lines long, the margins closely revolute, smooth or marked with slight asperities. Pedicels 1 to 3 lines long, with a few narrow pointed bracts at their base, but none under the flower. Sepals broad, concave, very obtuse, glabrous, about 2 lines long. Petals broadly obovate, retuse. Stamens in 5 bundles of usually 3 each, without any free ones. Carpels 5, glabrous, 2-ovulate.

W. Australia. Drummond. The foliage resembles that of *Hibbertia recurvifolia* and *H. rostellata*.

C. cygnorum, Steud. in Pl. Preiss. i. 275, is unknown to me. It is described as having leaf-opposed peduncles, bracteate in the middle, which is so unlike the inflorescence of any *Dilleniaceæ*, that I cannot but suspect it is some very different plant incorrectly described.

4. ADRASTÆA, DC.

Sepals 5. Petals 5. Stamens 10, or occasionally fewer, in a single series, filaments dilated and regularly cohering in a short tube round the pistil. Carpels and fruit of *Hibbertia*.

The genus consists of only one species, with the habit of a *Hibbertia* or *Candollea*.

1. **A. salicifolia**, DC. Syst. Veg. i. 421. Branches rather slender, apparently erect, the young ones silky-hairy. Leaves linear or linear-oblong, mostly with a minute fine point, $\frac{3}{4}$ to $1\frac{1}{2}$ in. long, often bordered by a few remote and minute callous teeth, glabrous above when old, more or less silky underneath. Flowers small, sessile in clusters of small leaves in the older axils. Sepals lanceolate, very acute, nearly 3 lines long. Petals scarcely

ORCHID.
 Professor TATE mentioned a small orchid
 forwarded by Mrs. Richards, of Fowler's Bay.
 It was a Tasmanian specimen (*Pterostylis*
mutica), and it was strange that there should
 be such a wide difference in the localities.

QUARTZ CRYSTAL.

NEW PLANTS.

A communication from Mr. O. Tepper was
 read concerning some new plants. He said
 three plants had been mentioned as not
 before known to occur in South Australia;
 the first was a cyperaceous plant, growing in
 clefts of rock where a spring of water was
 oozing out; the long narrow leaves, 6-9 feet,
 growing in large tufts, gracefully draped the
 precipice and fallen boulders where it was
 found. Its scientific name was *Caladium*
brifidium (F.v.M.), hitherto known from Tas-
 mania, and occurred to the writer's know-
 ledge only at one very picturesque spot on
 the Onkaparinga River south of Clarendon.
 The second plant was a small orchid, *Praso-*
phyllum despectaris (J. Hooker), which had
 not been known before out of Tasmania. It
 seemed here very rare in the scrub of the
 hills. The third was a *Drassea* or sundew,
 seemingly quite new, which sent its flower-
 stalk from the dry hard soil and flowered a
 month before the leaves appeared. Baron
 von Mueller considered it a close relation to,

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but not identical with, *Drasera squamasa*, a
 West Australian species.

NOTES ON

longer, obovate-oblong, obtuse. Anthers oblong, longer than the filaments. Carpels 2, glabrous, 1-ovulate.—*Hibbertia salicifolia*, F. Muell. Fragm. i. 161.

Queensland. Freshwater swamps and rushy peat bogs about Moreton Bay and Moreton and Peel's Islands, *A. Cunninghamii*, M. Gillivray, F. Mueller.

N. S. Wales. Port Jackson, *R. Brown*; margins of bogs, *A. Cunninghamii*.

5. PACHYNEMA, R. Br.

(*Huttia*, Drumm. and Harv.)

Sepals 5. Petals 5, rarely reduced to 4 or 3. Stamens usually 10, outer ones in a single series all round the carpels, either all perfect, or 2 or 3 of them reduced to small staminodia; filaments either thickened and ovoid, or flat, short, and broad; anthers erect; two inner staminodia alternating with the carpels, and similar to the perfect stamens, except that the anthers are small and empty or wanting. Carpels 2, 2-ovulate. Styles and fruit of *Hibbertia*.—Perennial herbs or undershrubs, with erect, branching, rush-like or flattened stems, apparently leafless, the leaves being all reduced to minute scales, except sometimes a few at the base of the stem. Flowers small, on very short recurved lateral peduncles. Bracts minute.

A small genus, entirely Australian. The three species of one section all tropical, the fourth western.

SECT. 1. **Huttia**.—Filaments flat, very short. Anthers long. 1. *P. conspicuum*.

SECT. 2. **Pachynema**.—Filaments thick, ovoid. Anthers small, the cells somewhat diverging.

Stem and branches terete and rush-like 2. *P. junceum*.

Stem and branches flat.

Branches 1 to 2 lines broad, not glaucous 3. *P. complanatum*.

Branches $\frac{1}{4}$ to $\frac{1}{2}$ in. broad or more, very glaucous 4. *P. dilatatum*.

SECTION I. **HUTTIA**.—Filaments flat and very short. Anthers long.—*Huttia* (genus), Drumm. and Harv.

1. **P. conspicuum**, Benth. Stems erect, from a thick rhizome, 1 to 1½ ft. high, branching, terete and rush-like, glabrous or slightly hirsute at the base. Leaves few and small at the base of the stem, narrow and mostly 3-lobed, the upper ones all reduced to minute distant scales. Peduncles few towards the top of the branches, 2 to 4 lines long, rather thick and recurved, each bearing 1 flower, much larger than in the other species. Sepals fully 4 lines long, the outer ones lanceolate and acute, the inner broader, more obtuse and membranous on one side. Petals obovate or orbicular, entire. Stamens of the outer row usually 7 only, the anthers oblong-linear, with the cells opening laterally, the three others reduced to minute staminodia; the 2 inner staminodia like the perfect stamens, except that the anthers are lanceolate and petal-like, their cells empty with the inner valve smaller than the outer one.—*Huttia conspicua*, Drumm. and Harv. in Hook. Kew Journ. vii. 51.

W. Australia. Between Moore and Murchison rivers, *Drummond*; Murchison river, *Oldfield*.

SECTION II. **PACHYNEMA**.—Filaments ovoid, tapering at the top, with short terminal anthers.

2. **P. junceum**, Benth. Stems erect, branching, 1 to 1½ ft. high,

terete and rush-like, or very slightly compressed, but scarcely angular, finely striate. Leaves all reduced to minute distant scales. Peduncles usually solitary, slender, recurved, 1 to 3 lines long, or terminating the branches. Sepals orbicular, about 2 lines long, the outer ones rather smaller. Petals obovate-orbicular, entire, about the same size as the sepals. Stamens of the outer row usually 7 or 8, perfect, the filaments thick, fleshy and ovoid at the base, tapering at the top, where they bear 2 small innate diverging cells, the 3 or 2 other outer stamens reduced to minute staminodia, the 2 inner staminodia like the perfect stamens, but without anthers. Carpels 2, glabrous, tapering into pointed styles so as very much to resemble the stamens in shape. Ovules 2 in each ovary.

N. Australia. N. coast, *R. Brown*; Victoria river, *Bynoe*.

3. ***P. complanatum***, *R. Br. in DC. Syst. Veg.* i. 412. Erect, leafless and glabrous, like the last species, and the lower part of the stem at length terete, but the branches are all flattened with thin edges, more or less thickened in the middle, and seldom above 2 lines broad. Scales minute and distant. Peduncles exceedingly short, usually several together in a little cluster or short raceme. Flowers as in *P. junceum*. In the one I opened there were 8 perfect outer stamens, and I could not find the 2 minute abortive ones to complete the ring. The inner staminodia and carpels precisely as in *P. junceum*.—*Deless. Ic. Sel.* i. t. 73.

N. Australia. N. coast, *R. Brown*; Melville Island, *Fraser*; Port Essington, *A. Cunningham*, *Leichhardt*.

4. ***P. dilatatum***, *Benth.* Allied to *P. complanatum*, but apparently taller and more robust, of a very glaucous hue, and the branches, thick and angular, dilated upwards to the breadth of from $\frac{1}{2}$ to 1 in., and 2 to 3 lines broad even on the smallest branches. Peduncles on the edges of the branches or in the forks. Flowers as in the last two species. In one of those I examined I found all 10 of the outer stamens perfect.

N. Australia. Macadam range, *F. Mueller*.

ORDER III. MAGNOLIACEÆ.

Sepals and petals several, imbricate, and often passing gradually from the one to the other, deciduous; or in the Australian genus the calyx exceptionally 2- or 3-cleft. Stamens indefinite, hypogynous; filaments often thickened or dilated, anthers adnate. Carpels indefinite, rarely solitary, free or partially cohering. Ovules 2 or more, attached to the inner angle of the cavity, or rarely ascending from the base. Stigma sessile. Ripe carpels opening in 2 valves or indehiscent. Seeds with a crustaceous testa, often succulent externally; albumen copious, oily. Embryo minute, near the hilum, with divaricate cotyledons.—Trees or shrubs, often aromatic. Leaves alternate, undivided, reticulately penninerved, entire or toothed, with or without stipules. Flowers axillary or terminal, solitary or fasciculate, often large.

An Order chiefly distributed over tropical and eastern temperate Asia and North America, and only represented by one somewhat anomalous genus in the southern hemisphere.



1. *DRIMYS*, Forst.(Tasmania, *R. Br.*)

Sepals 2 or 3, membranous, united in the bud in a globular calyx, irregularly split or separating when open. Petals usually few. Filaments thick, the anther-cells parallel or divergent. Carpels various in number, mostly solitary in the Australian species, containing several ovules. Berries indehiscent.—Glabrous and aromatic trees or shrubs. Leaves marked with pellucid dots. Peduncles (in the Australian species 1-flowered) arising from the axils of deciduous scales at the base of the new shoots, but as these shoots are rarely developed till the fruit has ripened, the flowers appear to be in terminal umbels with a central bud. Flowers of a greenish-yellow or white, or in some species (not Australian) pink.

Besides the two Australian species, there are one in New Zealand, one or more in New Caledonia, one in Borneo, and one in South America.

Leaves tapering into a short petiole. Berries small, globular . . . 1. *D. aromatica*.
Leaves narrowed below, but obtuse or 2-auriculate at the very base.

Berries ovoid, about $\frac{1}{2}$ in. long 2. *D. dipetala*.

1. *D. aromatica*, *F. Muell. Pl. Vict.* i. 20. A bushy shrub or small tree, rarely attaining the height of 30 ft., and very dwarf in alpine stations. Leaves from elliptic-oblong and scarcely 1 in. long in alpine forms, to oblong-lanceolate, and fully 3 in. long in luxuriant specimens, obtuse or acute, always tapering at the base into a short petiole. Flowers polygamous, apparently in terminal umbels, on pedicels rarely exceeding $\frac{1}{2}$ in., the scaly bracts very small. Sepals usually 2, $1\frac{1}{2}$ to 2 lines long. Petals 2 to 8, nearly twice as long. Carpels solitary, or rarely 2 or 3. Stigma linear, terminal at first, but soon becoming lateral by the unequal growth of the carpel. Berries globular, about the size of a pea.—*Tasmania aromatica*, *R. Br.* in DC. Syst. Veg. i. 445; Deless. Ic. Sel. i. t. 84; Bot. Reg. 1845, t. 13; Hook. f. Fl. Tasm. i. 11.

Victoria. Humid forest-ranges from Mount Disappointment and the Dandenong mountains to the Australian Alps, ascending to at least 5000 ft. *F. Mueller*.

Tasmania. *R. Brown*; abundant in many parts of the island, from the level of the sea to the height of 4000 ft. on the mountains, *J. D. Hooker*.

2. *D. dipetala*, *F. Muell. Pl. Vict.* i. 21. A tall shrub. Leaves oblong-lanceolate or rarely oval-oblong, acute or acuminate, usually 3 to 5 in. long, narrowed towards the base, but all (except sometimes a few of the smaller leaves of lateral shoots) abruptly obtuse or minutely biauriculate at the very base, on an exceedingly short broad petiole, or almost sessile. Peduncles longer than in *D. aromatica*, and flowers rather larger. Sepals and petals usually 2 each. Carpels often 2 or 3, but one only usually enlarges. Stigma short or linear, more or less unilateral. Berry ovoid, fully $\frac{1}{2}$ in. long, and more succulent than in *D. aromatica*.—*Tasmania insipida*, *R. Br.* in DC. Syst. Veg. i. 445; *T. dipetala*, *R. Br.* ms. ex DC. Prod. i. 78; *T. monticola*, *A. Rich. Sert. Astrolab.* 50, t. 19.

N. S. Wales. Port Jackson, *Brown*; and in the interior, extending northward to Mount Lindsay, *W. Hill*; and Clarence and Hastings rivers, *Beckler*; southward to Illawarra, *A. Cunningham*, *Macarthur*, who gives it as the *Pepper shrub* of the colonists.

ORDER IV. ANONACEÆ.

Sepals usually 3, distinct, or more or less united in a 3-lobed or 3-toothed calyx (in *Eupomatia* united in one mass with the petals). Petals usually 6, hypogynous, in 2 rows, 3 outer ones alternating with the sepals, 3 inner ones alternating with the outer, sometimes all united in a ring at the base, those of each row valvate or imbricate in the bud. Stamens indefinite, usually very numerous, closely packed on the thickened torus, round or under the carpels, linear or wedge-shaped, with 2 adnate anther-cells on the back or edges, often concealed by the more or less dilated summit of the connectivum. Gynæcium of several, often very many carpels, distinct (except in *Eupomatia*), closely packed on the centre of the torus, terminating each in a capitate stigma, or in a thick oblong or rarely more slender style, stigmatic on the top or inner side. Ovules in each carpel either 1 or 2, ascending from the base, or 2 or more attached to the inner angle of the cavity, anatropous. Fruit either of several distinct carpels sessile or stalked, indehiscent and fleshy or pulpy, sometimes opening along the inner edge, or the carpels more or less united in a single mass. Seeds with or without an arillus. Albumen copious, always ruminate. Embryo very small, near the hilum.—Trees, shrubs, or woody climbers. Leaves alternate, simple, and quite entire, without stipules. Flowers sessile, or on 1-flowered pedicels, solitary, or few together, terminal, lateral, or axillary, usually of a greenish-yellow or purple colour.

A large Order, widely distributed over the New World as well as the Old, but chiefly confined to the tropics. Of the 6 Australian genera, 5 are more numerous represented in tropical Asia or Africa, the sixth is endemic. None are American.

Petals 6, nearly equal.

Petals spreading.

Petals broad, imbricate in the bud. Ovules or seeds several in each carpel

1. UVARIA.

Petals narrow, valvate in the very young bud, but soon spreading.

Ovules 1 or 2, erect in each carpel

2. POLYALTHIA.

Petals concave, not spreading, valvate.

Ovules 1 in each carpel, erect. (Flowers 3 to 4 lines diameter) .

3. POPOVIA.

Ovules several in each carpel. (Flowers about 6 lines diameter)

4. MELODORUM.

Petals, 3 outer like the sepals, 3 inner large, erect, very concave . . .

5. SACCOPEPALUM.

Petals and sepals united in a conical mass, which falls off entire . .

6. EUPOMATIA.

1. UVARIA, Linn.

Sepals broad. Petals 6, imbricate in the bud in each row, spreading. Stamens numerous and closely packed, rather flat, the connective produced into a shortly ovoid, or truncate appendage, concealing the cells in the normal species. Receptacle slightly raised. Carpels numerous, with a short truncate style, and several ovules in 2 rows along the inner angle. Berries distinct, sessile, or stalked, usually with several seeds.—Stems climbing or trailing. Flowers usually rather large, leaf-opposed or axillary.

A considerable genus, chiefly Asiatic, with a few African species. The following Australian ones are both endemic, and one of them a doubtful congener.

Petals all broad. Anthers dilated at the top, concealing the lateral cells . . 1. *U. membranacea*.

Inner petals narrow. Anthers shortly dilated at the top, showing the dorsal parallel cells 2. *U. heteropetala*.

1. ***U. membranacea*, Benth.** A long woody trailer, quite glabrous, except a slight tomentum on the petioles and buds. Leaves on short stalks, oval-oblong, obtuse, or with a very short, broad point, 5 to 6 in. long, 3 to 3½ in. broad, oblique, and somewhat cordate at the base, thin and membranous, with distant primary veins branching into the reticulate smaller venation. Flowers large, solitary, on peduncles of about ½ in. Petals obovate, very obtuse, fully 1 in. long, narrowed, and slightly united at the base. Connective truncate and dilated above the anther-cells. Carpels very numerous, but not seen in fruit.

N. Australia. Scrub at Cape York, *McGillivray*.

2. ***U. (?) heteropetala*, F. Muell. Fragm. iii. 1.** A scrubby shrub of 8 to 10 ft., the young branches densely pubescent. Leaves on very short petioles, broadly ovate, obtuse, or shortly acuminate, 2 to 4 in. long, not coriaceous, glabrous above, loosely pubescent underneath. Flowers dark purple, solitary, on very short recurved terminal or lateral pedicels. Sepals ovate-lanceolate, villous, 3 to 4 lines long. Petals imbricate in each series, the outer ones broadly ovate, attaining at least 7 lines, and probably longer when full grown, silky-villous outside, glabrous inside, the inner ones narrower and perhaps longer. Stamens numerous, the short triangular terminal appendage not dilated, showing the rather large dorsal parallel cells. Carpels numerous, densely hirsute; stigma small. Ovules 6 to 8 in each carpel, in 2 series. Fruit unknown.

Queensland. Port Denison, *Fitzalan*. This plant differs from *Uvaria* in the stamens, which are those of *Saccopetalum*. The habit and foliage are also more those of the latter genus than of *Uvaria*, but the petals certainly appear to be imbricate in each row, and the outer ones are much more developed than is usual in *Saccopetalum*. The flowers in the specimens seen are however still young, and insufficient for fixing the precise affinities of the species.

2. **POLYALTHIA**, Blume.

Sepals broad. Petals 6, valvate in the very young bud, in two rows, but spreading or open long before they have attained their full size, nearly equal and flat, usually narrow. Stamens numerous, narrow-wedge-shaped, the connective flattened at the top, concealing the cells. Torus slightly raised. Carpels several, with a short, oblong, or capitate style, and 1 or 2 erect ovules. Berries stalked, globular or ovoid.—Trees or shrubs. Flowers solitary or clustered, axillary or leaf-opposed.

A considerable genus, chiefly Asiatic, with one African species. The following Australian one extends to New Caledonia.

1. ***P. nitidissima*, Benth.** A tree of 15 to 50 or 60 ft., glabrous in all its parts. Leaves elliptical, or the upper ones almost lanceolate, obtuse or obtusely acuminate, 2 to 3 in. long, narrowed into a petiole varying from 2 to 5 lines, smooth and shining, the veins fine and reticulate, but not numerous. Peduncles solitary, axillary, 3 to 6 lines long, or more when in fruit, with 2 or 3 small bracts near the base. Sepals short and broad. Petals linear, rather thick, 5 or 6 lines long when fully out, but spreading very early.

Stamens very short, and closely packed. Carpels 10 to 20 in the flower, much fewer in the fruit, and then globular or shortly ovoid, 1-seeded, shortly stalked.—*Unona nitidissima*, Dun. Anon. 109, t. 23; *Unona fulgens*, Labill. Sert. Austr. Caled. 57, t. 56; *Unona nitens*, F. Muell. Fragma. iii. 2.

Queensland. In brushes on islands in Moreton Bay, *A. Craxingham*; Port Denison, *Fitzalan*. Also found in New Caledonia.

In some specimens the torus, after flowering, becomes thick and woody, enclosing several cavities, probably a deformity occasioned by the puncture of some insect. Labillardiere describes and figures the carpels as having several ovules, but this is a mistake; his own specimens, quite similar to the Australian ones, have but one erect ovule in each.

3. POPOWIA, Endl.

Sepals ovate. Petals 6, valvate in the bud in 2 rows, short, broad, concave, those of the 2 rows nearly equal, but the outer ones rather more open. Stamens numerous, closely packed, wedge-shaped, the connective flattened at the top, concealing the cells. Torus but little raised. Carpels indefinite (sometimes few), with a short obovate or capitate style and 1 or 2 erect ovules. Berries stalked, globular or ovoid.—Trees or shrubs. Flowers small, axillary or leaf-opposed, on short pedicels.

A small genus, scattered over tropical Africa and Asia, with one species endemic in Australia. As a genus it is scarcely sufficiently distinct from *Polyalthia*.

1. *P. australis*, Benth. Probably a shrub. Leaves ovate-lanceolate or oblong, 3 to 5 in. long, obtuse, rounded at the base with a very short broad petiole, glabrous on both sides, the primary veins prominent underneath. Pedicels solitary or 2 or 3 together in the axils of the older leaves, longer than in most species of the genus, attaining near 1 in. Expanded flowers 3 or 4 lines diameter. Petals broadly ovate, rather thick, pubescent and strictly valvate in each row. Carpels numerous, hairy. Ovule solitary, erect.

N. Australia. Barrow Bay, Port Essington, *Armstrong*.

4. MELODORUM, Dun.

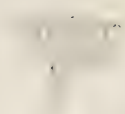
Sepals small, united at the base. Petals 6, valvate in the bud in 2 rows, the outer ones broad, thick, concave, connivent or scarcely open, the inner ones smaller. Stamens numerous, the connective ovate or truncate, concealing the cells. Torus convex or conical. Carpels several, with an oblong thick style and 2 or more ovules in each, attached to the inner angle. Berries distinct, sessile or stalked.—Stems woody, usually climbing. Primary veins of the leaves prominent underneath. Flowers terminal or leaf-opposed.

The genus comprises several species dispersed over tropical Asia and the Indian Archipelago, the Australian one endemic.

1. *M. Leichhardtii*, Benth. A shrub or tree, with flexuose (or somewhat climbing?) branches, the younger ones slightly rusty-tomentose. Leaves much like those of *M. elytnos*, Hook. f. and Thoms., but with very much shorter petioles, oblong, obtuse or obtusely acuminate, about 3 in. long, coriaceous, glabrous and shining, sprinkled on the under side with a few minute, almost microscopic, fringed scales or stellate hairs, the veins much less prominent than in most



Melodorum Macgregarii F. M. 1888



species. Peduncles $\frac{1}{2}$ to $\frac{3}{4}$ in. long, rusty-tomentose. Flowers nearly $\frac{1}{2}$ in. in diameter. Sepals 3 lines long, spreading. Outer petals about 6 lines, slightly tomentose, very obtuse, concave and connivent, inner ones thicker and rather shorter. Stamens very numerous. Berries stipitate, either depressed-globose, 4 or 5 lines diameter and 1-seeded, or somewhat oblong, 2-seeded with a slight transverse furrow between the seeds, or moniliform, consisting of 2 depressed-globose 1-seeded or oblong 2-seeded portions.—*Unona Leichhardtii*, F. Muell. Fragm. iii. 41.

Queensland. Wide Bay, *Bidwell*; Mount Torompa and woods at McConnell's Brush, *Leichhardt*; near Ipswich, *J. Vernal*; Rockhampton, *Thozet*; Brisbane river, *A. Cunningham*, F. Mueller.

N. S. Wales. Clarence river, *Beckler*.

5. SACCOPETALUM, Benth.

Sepals small. Petals 6, valvate in 2 rows, the outer ones small and resembling the sepals, the inner large, erect, and very concave. Stamens numerous but loosely imbricate, showing the anther-cells on their back just below the short tips. Torus nearly globular. Carpels several, with an ovoid or oblong thick style, and 6 or more ovules in each attached to the inner angle. Berries globular.—Trees or shrubs, with deciduous leaves. Flowers usually appearing on the young shoots before or with the young leaves.

A small genus, dispersed over India and the Archipelago; the Australian species endemic.

1. S. Bidwilli, Benth. Apparently a shrub, with rather weak branches, densely hirsute with short rusty hairs. Leaves very shortly stalked, oblong or obovate-oblong, obtuse or very shortly acuminate, 3 to 4 in. long, rounded at the base, glabrous above, hairy underneath. Flowers lateral, solitary or 2 together, on very short pedicels. Sepals thin, lanceolate, hairy, about $\frac{1}{2}$ lines long. Outer petals similar, but twice as long. Inner petals when fully developed $1\frac{1}{2}$ in. long, not saccate at the base only, as in most other species of the genus, but hollowed into a broad boat-shape all the way up, with the upper end turned inwards, thin, and very hairy both inside and out. Stamens numerous, the anther-cells contiguous and conspicuous, terminated by the small flat tip of the connectivum. Carpels very hairy in the flower, when ripe nearly sessile, oblong, 6 to 8 lines long, thick and hard, covered with rusty hairs, containing 3 to 6 flattened seeds.

Queensland. Wide Bay, *Bidwill*.

6. EUPOMATIA, R. Br.

Sepals and petals completely consolidated into one mass, the upper part falling off in a conical lid, leaving the lower campanulate tube (or enlarged peduncle) filled with the thick flat-topped torus. Stamens inserted on the margin of the torus, the inner ones in many rows, converted into petal-like obovate staminodia, the outer ones in fewer rows, perfect, linear-lanceolate, curved, with acuminate tips and longitudinal dorsal anther-cells. Carpels many, immersed in the torus, appearing like the cells of a single inferior ovary, the stigmas adnate on the flat areolate surface; ovules several in each carpel or cell. Fruit several-celled, formed of the enlarged perianth-tube more or less enclosing the carpels, becoming turbinate or urceolate and suc-

culent. Seeds 1 or 2 in each cell, irregularly angular; albumen ruminate, and embryo precisely as in the more normal *Anonaceæ*.—Shrubs or undershrubs, quite glabrous. Leaves alternate, entire, shortly petiolate. Peduncles short, 1-flowered, terminal or lateral.

The genus is confined to Australia.

Petioles shortly decurrent. Flowers terminal. Outer staminodia spreading and longer than the stamens. Fruit turbinate 1. *E. Bennettii*.
 Petioles not decurrent. Flowers lateral. Staminodia all connivent,
 shorter than the stamens. Fruit urceolate 2. *E. laurina*.

1. ***E. Bennettii***, *P. Muell. Fragm.* i. 45. A shrub or undershrub, 1 to 2 ft. high and quite glabrous. Leaves oblong-lanceolate, acuminate or acute, 3 to 5 in. long, narrowed at the base into a short petiole, which is again enlarged at the base and shortly decurrent on the stem, leaving oblique raised lines when they fall off. Flowers solitary, terminal, on a short peduncle above the last leaf, when fully expanded rather more than 1 in. diameter. Petal-like staminodia very numerous, yellow, the outer ones stained with orange or blood-red, beset with stipitate glands and bordered with stellate hairs spreading and completely concealing the perfect stamens, which are reflexed on the peduncle, the inner staminodia shorter and connivent. Fruit turbinate, about $\frac{3}{4}$ in. diameter, the pericarp thin, the top convex, with the tips of the carpels distinctly prominent, the base of the perianth scarcely projecting as a slight ring round the edge.—*E. laurina*, Hook. in Bot. Mag. t. 4848.

Queensland. Brisbane river, *Herb. Mueller*.

2. ***E. laurina***, *R. Br. in Flind. Voy.* ii. 597, t. 2. An erect glabrous shrub with weak branches. Leaves evergreen, oblong or almost elliptical, shortly acuminate, 3, 4, or sometimes 5 in. long, narrowed into a short petiole which is not decurrent on the branch. Flowers solitary, on short lateral or nearly axillary peduncles, the buds at first oblong, becoming nearly globular and about $\frac{1}{2}$ in. diameter before opening; when the bud has fallen the stamens expand to about 1 in. diameter. Petal-like staminodia connivent or the outer ones scarcely open, glabrous or with a very few stipitate glands; perfect stamens longer, erect or spreading, the linear anthers tipped by a short fine point, the filaments dilated. Fruit urceolate-globular, nearly $\frac{1}{2}$ in. diameter, the persistent base of the perianth forming a narrow rim projecting above the nearly flat top.—*F. Muell. Fragm.* i. 45.

Queensland. Brisbane river, *F. Mueller*; Pine river, *Fitzalan*.

N. S. Wales. Woods and thickets in the colony of Port Jackson, especially in the mountainous districts, and on the banks of the principal rivers, *R. Broca*, and apparently along the whole coast from Clarence river, *Beckler*, to Twofold Bay, *F. Mueller*.

ORDER V. MENISPERMACEÆ.

Flowers dioecious. Sepals usually 6 in 2 series, rarely 9 or 12 in 3 or 4 series, or very rarely 5 or fewer, imbricate or very rarely valvate in each series, the inner ones the largest. Petals usually 6, smaller than the sepals (except in *Sarcopetalum*), nearly equal but imbricate in 2 series in the bud, rarely fewer or none. Male fl.: Stamens usually 6, free and opposite the petals, or united in a central column, rarely 9 or more or only 3. Female fl.: Sta-

minodia usually 6, free. Carpels distinct, usually 3, sometimes 6 or more or only 1, containing 1 or very rarely 2 amphitropous ovules peltately attached to the inner angle. Style terminal, usually recurved, and often expanding into a short sessile stigma. Fruit-carpels drupaceous, nearly straight, or more frequently curved, so that the remains of the style are near the base, the putamen then becoming more or less horseshoe-shaped, with an inner projection of the endocarp bearing the placenta. Seed taking the shape of the cavity, with a thin membranous testa. Albumen sometimes fleshy, entire or ruminant, sometimes thin or none. Embryo nearly as long as the albumen or occupying the whole seed, the radicle pointing to the remains of the style.—Climbers, usually woody, or in a very few non-Australian species erect herbs or shrubs. Leaves alternate, without stipules, entire or rarely palmately lobed, usually with 3 or more palmate ribs at the base. Flowers small, in axillary panicles, racemes, or cymes.

A considerable tropical Order, both in the New and the Old World, a very few species extending into more temperate regions in North America, eastern Asia, or southern Africa. Of the 7 Australian genera 3 are endemic, the others Asiatic or African.

Sepals imbricate. Petals 6. Stamens 6, free. Carpels 3.
Flowers in simple racemes.

Inner sepals broad and thin. Carpels of the fruit ovoid, the style at the top. Seed albuminous, nearly straight 1. TINOSPORA.

Inner sepals narrow-ovate. Carpels of the fruit broad, the style near the base. Seed without albumen 5. PACHYGONE.

Flowers in much-branched cymes. Carpels of the fruit broad, the style near the base. Seed albuminous 2. PERICAMPYLUS.

Sepals imbricate or open. Petals usually 3 to 5. Stamens united in a central column. Carpels broad, the style near the base. Seed albuminous.

Sepals very small. Petals thick and fleshy, almost globular. Anthers 2 or 3. Carpels 3 to 6. Flowers racemose 3. SARCOPTALUM.

Petals smaller than the sepals, concave. Anthers 4 or 5. Carpels solitary. Flowers umbellate 4. STEPHANIA.

Inner sepals valvate. Petals 6. Stamens 3. Carpels about 6, when in fruit broad, the style near the base. No albumen 6. PLEOGYNE.

Petals imbricate. Petals 3. Stamens 9 to 12. Carpels 3, 2-ovulate 7. ADELIOPSIS.

1. TINOSPORA, Miers.

Sepals 6, in 2 series, the inner ones large. Petals 6, smaller than the sepals, nearly flat. Male fl.: Stamens 6, free, thickened towards the top, the anther-cells lateral. Female fl.: Staminodia 6. Carpels 3, stigmas jagged. Drupes ovoid, the remains of the style nearly terminal. Putamen slightly concave on the inner face, the internal projection hemispherical and hollow, forming an empty cell. Seed disk-shaped, albuminous. Cotyledons ovate, spreading laterally.—Leaves cordate or truncate at the base. Flowers usually clustered in long simple racemes.

A small genus, chiefly Asiatic, but extending also to tropical Africa. The Australian species endemic.

Leaves ovate-cordate, entire. 1. *T. smilacina*.
Leaves broad, obtusely 3-lobed, much veined 2. *T. Walcottii*.

1. *T. smilacina*, Benth. in Journ. Linn. Soc. v. Suppl. 52. A glabrous

twiner, the branches somewhat succulent. Leaves ovate, deeply and broadly cordate at the base, or almost hastate with rounded auricles, obtuse or scarcely acuminate, 3 or 4 in. long, 5-nerved, the smaller pinnate veins scarcely prominent, on petioles of about 1 in. Flowers green, the male racemes 2 or 3 in., the females about 1 in. long; pedicels about 1 line. Sepals, 3 outer ones very small and triangular, 3 inner ones about 1 line long, ovate, thin, spreading. Petals about half as long as the inner sepals, obovate. Anthers terminal, ovoid, almost globular, the cells almost parallel. Drupes oblong, about 3 lines long.

N. Australia. Islands of the Gulf of Carpentaria, *R. Brown*; common in many parts of Arnhem's Land and thence to the Burdekin, *F. Muell.* Nearly allied to the Asiatic *T. crispa*, but the leaves are rather differently shaped and the fruits much smaller.

2. **T. Walcottii**, *F. Muell. Herb.* Of this I have only seen fragments of a fruiting specimen with the drupes not quite ripe, but sufficiently so to show the peculiar form of *Tinospora*, with the somewhat succulent branches and with the racemes of *T. smilacina*, but the leaves appear to be as broad as long, obscurely 3-lobed, cuneate and not cordate at the base, of a thinly coriaceous texture, with prominent reticulate veins.

N. Australia. Nichol Bay, *Walcott*.

2. PERICAMPYLUS, Miers.

Sepals 6 in 2 series, the inner ones larger. Petals 6, smaller than the sepals, the edges embracing the stamens. Male fl.: Stamens 6, free, the anther-cells lateral. Female fl.: Staminodia 6. Carpels 3, the styles 2-cleft. Drupes globular, somewhat flattened, the remains of the style near the base. Putamen horseshoe-shaped, crested on the back, the sides concave. Seed horseshoe-shaped. Embryo in the axis of the albumen, with narrow cotyledons closed against each other. —Leaves broad. Cymes dichotomously branched.

The genus is limited to the following species.

1. **P. incanus**, *Miers; Hook. and Thoms. Fl. Ind. i. 194.* Achenium with the younger branches shortly tomentose or at length glabrous. Leaves nearly orbicular, sometimes slightly peltate, 2 to 4 in. or sometimes above 5 in. diameter, glabrous above, usually hoary underneath, on petioles of 1 to 2 in. Flowers very small, in axillary dichotomous cymes, shorter than the leaves. Sepals hairy on the back. Drupes red. —*Cocculus Moorei*, *F. Muell. Fragm. i. 162.*

Queensland. Woody vall. ys. Moreton Bay and Wide Bay, *C. Moore, W. Hill, F. Muell.*

N. S. Wales. *R. Brown*: Illawarra, Port Macquarie, Pooral on the Karuk river, and Port Stephens, *Backhouse*. —Common in eastern India and the Malayan Archipelago, extending northward to S. China.

3. SARCOPETALUM, F. Muell.

Sepals 2 to 5, small. Petals 3 to 6, thickly fleshy, nearly globular. Male fl.: Stamens united in a column, divided at the top into 2 or 3 short horizontal lobes, each bearing a 2-celled anther. Female fl.: Carpels 3 to 6, with recurved lobed stigmas. Drupes flattened, the remains of the style near the base. Putamen horseshoe-shaped, the sides concave. Seed horseshoe-shaped.

Embryo curved, linear, in rather copious albumen; cotyledons closed.—Racemes simple.

The genus is limited to the following species.

1. **S. Harveyanum**, *F. Muell. Pl. Vict.* i. 27 and 221, *t. suppl.* 3. A tall woody climber, with thick terete stems. Leaves broadly ovate or orbicular, acuminate or rarely obtuse, and sometimes angular or lobed, attaining 4 to 6 in. in breadth, deeply cordate at the base or sometimes slightly peltate, 7- to 9-nerved, quite glabrous, on a petiole of 1 to 3 in. Racemes simple, axillary or mostly lateral below the leaves, solitary or clustered, 1 to 3 in. long. Bracts small. Pedicels about 1 line long. Flowers reddish-yellow, scarcely 2 lines diameter, the sepals usually shorter than the thick almost gland-like petals. Drupes 3 or 4 lines diameter, almost pear-shaped.

Queensland. Moreton Bay, *W. Hill*.

N. S. Wales. Port Jackson to the Blue Mountains, *R. Brown* and others; southward of the colony, *A. Cunningham*, to Twofold Bay, *F. Mueller*.

Victoria. Forests near the mouth of Snowy river, *F. Mueller*.

4. STEPHANIA, Lour.

(*Clypea*, *Blume*.)

Male fl.: Sepals 6, 8, or 10, in 2 series. Petals 3, 4, or 5, shorter than the sepals, obovate. Stamens united in a column bearing a flat disk, with the sessile anthers confluent into a single ring round the margin. Female fl.: Sepals 3, 4, or 5. Petals as many. Carpel 1, with a divided stigma. Drupe compressed, the scar of the style not far from the base. Putamen horseshoe-shaped, with an open concavity on each side. Seed curved, with little albumen. Embryo linear, with closed cotyledons.—Leaves mostly peltate. Flowers in simple or compound umbels.

A small genus, extending over tropical or subtropical Africa and Asia. The Australian species common over the whole range.

1. **S. hernandiæfolia**, *Walp.; Hook. and Thoms. Fl. Ind.* i. 196. A glabrous or more or less pubescent climber. Leaves broadly ovate, orbicular, or nearly triangular, usually more or less peltate at the base, the larger ones 3 or 4 in. long, on a petiole of 2 or 3 in., but often much smaller, glabrous or pubescent underneath. Peduncles axillary, shorter than or rather longer than the petioles, bearing an umbel of about 5 rays, each ray terminated by a head or partial umbel of 8 to 12 small sessile or shortly pedicellate flowers, or the partial umbel again compound.—*F. Muell. Pl. Vict.* i. 220; *Clypea hernandiæfolia*, *W. and Arn. Prod.* i. 14; *Wight, Ic.* i. 939.

N. Australia. N. coast, *R. Brown*; rocky declivities and cataracts of Fitzroy and Stokes' Range, *F. Mueller*.

Queensland. Keppel Bay, *R. Brown*; tropical districts, *A. Cunningham*; Moreton Bay, Taylor's Range, and Burnett river, *F. Mueller*.

N. S. Wales. Near Sydney, *American Exploring Expedition, Harvey*, and others, northward to Clarence river, *Breckler*, and southward to Hawara and Twofold Bay, *F. Mueller*, but rare in the latter locality.

Victoria. Forest glens, S. E. extremity of Gipps' Land, *F. Mueller*.

The glabrous form, *S. australis*, *Miers*: *A. Gray*, in *Bot. U. S. Expl. Exped.* i. 38, and the pubescent one, *S. Gaudichaudii*, *A. Gray*, in *Bot. U. S. Expl. Exped.* i. 37, have been

distinguished as species: but they almost always grow together, and pass gradually from the one to the other.

The species extends from eastern Africa almost all over India and the Archipelago, and northward to China.

5. **PACHYGONE**, Miers.

Sepals 6 or 9, in 2 or 3 series, the inner ones larger, imbricate. Petals 6, shorter than the sepals, embracing the stamens at the base. Male fl.: Stamens 6, free, incurved at the top, anthers small, globose-didymous. Female fl.: Staminodia 6. Carpels 3, with thick horizontal stigmas. Drupes reniform, the scar of the style near the base; putamen slightly excavated, with an internal process. Seed horseshoe-shaped, without albumen, cotyledons semiterete, almost horny, the radicle very short.—Leaves ovate. Flowers in racemes, the males clustered along the rachis, the females solitary.

Besides the Australian species, which is endemic, the genus comprises one from tropical Asia, which alone has furnished so much of the above character as relates to the female flower and fruit.

1. **P.(?) pubescens**, Benth. A woody climber, the young branches pubescent. Leaves petiolate, broadly ovate, shortly acuminate or rarely obtuse, 3 to 4 in. long, 5-nerved at the base, coriaceous, glabrous and shining or slightly scabrous above, pubescent underneath. Male racemes axillary, often 2 or 3 together, many-flowered but much shorter than the leaves, pubescent. Pedicels clustered, about 1 line long. Flowers glabrous, scarcely more than 1 line diameter when open. Sepals 9, in 3 series, the outer ones small and lanceolate, the next longer, the innermost still larger, narrow-ovate. Petals about half as long as the inner sepals. Stamens 6; anthers globose-didymous, almost 4-lobed. Female flowers and fruit unknown.

Queensland. Quail Island, Flood (*E. Mueller*). In the absence of the female flowers and fruit, the genus of this plant cannot be fixed with certainty. The form and venation of the leaves, the inflorescence and general structure of the male flowers, are so nearly those of the E. Indian *Pachygone ovata*, that I might have taken it for a large-leaved, more pubescent variety of that species, but for the presence of a third outer series of small sepals which are not in *P. ovata*: the inner sepals are also narrower than in that species, and not ciliate. I have only been able to examine 2 flowers; the persistent pedicels were very numerous, but almost every flower had already fallen from the only two specimens I have seen.

6. **PLEOGYNE**, Miers.

(*Microclisia*, Benth.)

Outer sepals about 6, very small, 3 inner ones much larger, valvate in the bud, connivent at the base and recurved at the top when open. Petals 6, much shorter, the margins dilated and involute. Male fl.: Stamens 3; filaments linear-terete; anthers small, globose-didymous. Female fl. with 6 carpels (*Miers*). Drupes 3 to 6, reniform, with the scar of the style lateral, the putamen not excavated on the sides, nor with any internal process. Seed reniform, without albumen; cotyledons thick and fleshy, scarcely separable; radicle scarcely distinct. —Flowers in short axillary branching panicles.

The genus is limited to a single species. Miers had originally characterized it very shortly from female specimens only, and I failed to recognize it in the male specimens I possessed with others in fruit, which did not show the increased number of carpels near

tioned by Miers. I was therefore induced to publish it as new under the name of *Microclisia*. The further more perfect fruiting specimens I have since seen have enabled me to identify it with a very imperfect fragment named by Miers in A. Cunningham's herbarium. The genus is distinguished from all, except the African *Triclisia*, by the remarkably valvate inner sepals.

1. *P. australis*, Benth. A climber, with a soft pubescence like that of *Pericampylus*, sometimes very copious, sometimes quite disappearing from the upper surface of the leaves. Leaves from ovate to oblong, obtuse or scarcely acute, the larger ones 3 to 4 in. long, rounded but not cordate at the base, at length rather coriaceous and shining above, reticulately pinninerved. Male cymes or single flowers in little axillary solitary or clustered panicles, seldom above 1 in. long, and softly pubescent. Inner sepals about 1 line long, the outer ones very minute. Female inflorescence probably more simple. Drupes about 5 lines broad, glabrous, with a very thin endocarp.—*Microclisia*, Benth. in Benth. and Hook. Gen. Pl. part i. Addend. 435.

Queensland. Koppel Bay, R. Brown. Mordon Bay, A. Cunningham, F. Mueller; Fitzroy river, F. Mueller.

7. ADELIOPSIS, Benth.

Sepals 6, in 2 rows, the inner ones considerably larger, and 2 or 3 outer smaller bracts, all much imbricate in each row. Petals 3, smaller than the inner sepals, broad and slightly concave. Male fl.: Stamens 9 to 12; filaments linear-terete; anthers small, globose-didymous. Female fl.: Staminodia wanting. Carpels 3, with a large, recurved, broad and thick stigma, and 2 ovules in each carpel, inserted one above the other on the inner angle. Fruit unknown.—Flowers clustered in short axillary spikes.

The genus consists of a single species, which has the habit, imbricate sepals, and the general form of the stamens and carpels of *Pachygone*, to which I should have referred it, but for the petals reduced in number and not involute, the increased number of stamens in the males and their entire deficiency in the females, and for the 2 ovules in each carpel. The latter character appears constant, as far as I have been able to ascertain, and does not exist to my knowledge in any other Menispermaceous plants. The fruit being unknown, the tribe to which the genus must be referred cannot as yet be fixed; but it will stand either next to *Coccolas* amongst *Coccolaceæ*, or more probably near *Pachygone* in *Pachygonaceæ*.

1. *A. decumbens*, Benth. Branches rather thick, leafy, densely clothed with a soft velvety tomentum or almost hirsute, and from the name given, probably decumbent and not climbing. Leaves ovate or oval-oblong, $1\frac{1}{2}$ to 2 in. long, very obtuse, rounded at the base, thickly coriaceous, softly tomentose or velvety on both sides when young, becoming nearly glabrous above when old, the thickened revolute nerve-like margin terminating at the top of the midrib on the under side in a prominent hirsute gland or tuft of hairs. Flowers small, in little clusters along the rachis of short axillary spikes, seldom above $\frac{1}{2}$ in. long, the outer bracts very small, acute, and hairy, the outer sepals also hairy, but rather larger and more obtuse, the inner sepals much larger, orbicular, and glabrous, except the ciliate edge, the petals about $\frac{2}{3}$ as large as the inner sepals and quite glabrous.

Queensland. N. E. coast, near Cape Fear (Fair Cape?), R. Brown, described in his notes (without mention of the ovules) under the name of *Adeloides decumbens*, but, as in many other cases, the term *Adeloides* was evidently intended as a memorandum, not as a generic name, for which it is unsuited (*Hb. R. Br.*).

ORDER VI. NYMPHÆACEÆ.

Sepals 3 to 5, petals 3 or more and stamens 6 or more, either all free and hypogynous, or the inner ones or all adnate at the base to the torus or ovary, or inserted on its summit. Anthers innate or adnate, the cells opening in longitudinal slits. Gynæcium of 3 or more carpels, either free and distinct, or immersed in the torus so as to form a several-celled ovary. Styles or stigmas free or adnate on an epigynous disk. Ovules solitary, and suspended from the apex of the cavity, or indefinite and attached to the sides of the cavity, not to its inner angle. Ripe carpels indehiscent, free or united in a fleshy or spongy fruit. Seeds immersed in a fleshy or pulpy arillus, or naked, the embryo either small, enclosed in the embryo-sac and half immersed in a cavity of a farinaceous albumen near the hilum, or without albumen, large, with thick fleshy cotyledons, and a remarkably developed plumule.—Aquatic herbs, with a submerged root or rhizome. Leaves carried by their long petioles to the surface of the water or raised above it, usually peltate or deeply cordate, or a few remaining under water and deeply cut. Flowers growing singly on long radical scapes, or axillary peduncles, either on the surface of the water or raised above it.

The Order, although not numerous in species, is found in pure, quiet, or slowly-flowing waters nearly all over the globe. The three Australian species belong to the three genera, considered as typical of as many tribes or suborders, raised by some botanists to the rank of distinct Orders. All three genera are common to the New and the Old World. They are absent, however, from the southern Australian colonies as well as from New Zealand.

Sepals and petals 3 each. Carpels 6 or more, free, on a small torus.

Ovules few. Flowers small

1. *Brasenia*.

Sepals 4 to 6. Petals and stamens numerous, the outer ones free, the inner more and more adnate to the torus. Carpels immersed in the torus in a ring round a central conical projection

2. *Nymphæa*.

Sepals 4 or 5. Petals and stamens numerous, hypogynous. Carpels half immersed without order in the flat top of the torus. No albumen

3. *Nelumbium*.

1. **BRASENIA**, Schreb.

(*Hydropeltis*, Mich.)

Sepals 3, petal-like, and petals 3, hypogynous. Stamens 12 to 18, hypogynous; filaments subulate, anther-cells lateral. Carpels 6 to 18, free, on a small torus, attenuate at the top into short styles, stigmatic along the inner edge. Ovules 2 or 3, pendulous from the dorsal side of the cavity. Ripe carpels coriaceous, indehiscent. Seeds albuminous.

The genus is limited to the following species.

1. ***B. peltata***, Pursh. *Fl. N. Amer.* 389. Rhizome prostrate at the bottom of the water. Stems forked, leafy, covered as well as other submerged parts, especially when young, with a thick coating of transparent jelly. Leaves floating on the surface of the water, peltately attached by their centre to long petioles, oval, entire, 3 to 4 in. long and about half as broad. Peduncles axillary, bearing solitary flowers of a dull purple on the surface of the water. Sepals and petals very much alike, about 4 or 5 lines long when they first open, but lengthening to 7 or 8 lines. Carpels shorter.—A. Gray,

Gen. III. t. 39; *Hydropeltis purpurea*, Mich.; DC. Prod. i. 112; Bot. Mag. t. 1147.

N. Australia? *R. Brown.*

Queensland. Lagoons near Moreton Bay, *F. Mueller.*

The species is abundant in the waters of North America and of East India.

2. NYMPHÆA, Linn.

Sepals 4, inserted near the base of the torus. Petals numerous, passing gradually from the sepals to the stamens, inserted on the torus or ovary, the outer petals near the base, the inner stamens almost at the top. Filaments of the outer stamens dilated and petal-like, with small lateral anther-cells, of the inner ones narrow or filiform, with longer anthers opening inwards. Carpels several, immersed in a ring in the fleshy torus, having the appearance of a several-celled ovary, with a conical or globular process in the centre. Styles thick, radiating, free or united at the base, often with an incurved appendage beyond the stigmatic portion. Ovules numerous, pendulous from the sides of the cavity. Fruit a spongy berry, breaking up irregularly when ripe. Seeds embedded in pulp, arilate, albuminous. Rhizome perennial. Leaves floating, peltate or very deeply cordate. Flowers large, solitary, floating on the surface of the water or slightly raised above it, on long radical peduncles.

The most considerable genus of the Order, chiefly in the northern hemisphere or within the tropics, but represented also in S. Africa.

1. **N. gigantea**, *Hook. Bot. Mag. t. 4647*. Leaves orbicular or very broadly ovate, very deeply cordate, the basal lobes separated by a very acute angle, or overlapping each other, or united near the petiole, rendering the leaf partially peltate, the principal nerves radiating from the petiole, raised underneath, and in the larger specimens the whole under side covered with raised reticulations; the margin entire or more frequently sinuate, or with short distant teeth. Flowers blue, purple, pink, or rarely white, the petals and stamens usually very numerous. Filaments nearly all filiform, or many of the outer ones flattened, but never very broad and always narrowed under the anther; connective narrow and scarcely projecting beyond the cells. Styles or stigmas thick, radiating, united at the base, either without any or with only a very short terminal appendage.—*F. Muell. Fragm. ii. 141; N. stellata, F. Muell. l. c. 142.*

N. Australia. Lakes and marshes throughout tropical Australia, *R. Brown, F. Mueller.*

Queensland. Wide Bay, *Bidwill*; Moreton Bay, *W. Hill.*

N. S. Wales. Clarence river, *Beckler.*

The species is apparently confined to Australia, unless it be really a modification of the Asiatic and African *N. stellata*, Willd., as appears to have been the opinion of Brown. It varies exceedingly in size. The larger specimens have the leaves about 18 inches across, with much-raised reticulations underneath, the flowers 12 in. across, with exceedingly numerous petals, and above 200 stamens; the smallest have leaves of 5 or 6 inches, not reticulate, the flowers 3 or 4 in. across, and the petals and stamens much fewer, but always more numerous than is usual in *N. stellata*, to which *F. Muell.* is disposed to refer several specimens. This Indian species may also be distinguished by the connective lengthened beyond the anther-cells into a very prominent appendage, and it appears to me that Caspary (notes in Herb. Hooker) is right in considering all the Australian specimens as forms of *N. gigantea*. In the Kew Gardens the flowers and leaves are very small in the early part of the season, and larger and larger ones are developed as the season advances. *F. Muell.* also distinguishes

the seeds in size and shape, smaller, more ovoid, and more completely enclosed in the arillus in those he refers to *N. stellata*, than in the true *N. gigantea*; but in the true *N. stellata* the seeds are nearly globular, and usually marked with raised longitudinal costae, not mentioned by P. Mueller. I have not myself seen the ripe seeds of Australian specimens.

The rhizome and fruits are used as an article of food by the aborigines.

3. *NELUMBIUM*, Juss.

Sepals 4 or 5, free. Petals and stamens numerous, hypogynous. Anthers opening inwards, the connective produced in a club-shaped appendage. Carpels several, half-immersed in the flat top of an obconical torus, the styles shortly projecting with somewhat dilated terminal stigmas. Ovules 1 or 2 in each carpel, suspended from the top of the cavity with a dorsal raphe. Nuts nearly globular, shortly protruding from the cells of the large flat-topped torus. Seeds with a spongy testa, without albumen; cotyledons thick and fleshy, enclosing a much-developed plumula, radicle very short. Leaves peltate, supported above the water on erect petioles. Flowers solitary, on erect scapes above the water.

Besides the following Asiatic and Australian species, there is a second one from the West Indies.

1. *N. speciosum*, Willd.; DC. *Prod.* i. 113. Leaves orbicular, peltate, somewhat concave, 1 to 2 ft. diameter, quite entire or slightly sinuate, glabrous and often somewhat glaucous. Flowers pink, 4 to 8 in. diameter, appendage of the anthers linear-clubshaped. Fruit 2 to 4 in. diameter, the nuts from the size of a pea to that of a small cherry. — Bot. Mag. t. 3916, 3917.

N. Australia. Swamps in Arnhem's Land, P. Mueller; Lower Condamine river, *Coron.*

Queensland. Mackenzie river, P. Mueller.

The species is widely distributed over the warmer regions of Asia, extending northwards to the Caspian Sea in the west, and to Japan in the east.

ORDER VII. PAPAVERACEÆ.

Flowers hermaphrodite, regular, or, in *Fumariæ*, irregular. Sepals 2 or 3, rarely 4, free, imbricate, very caducous. Petals 4, 6, or rarely 8 or 12, hypogynous, free, imbricate, and often crumpled in the bud, in 2 rarely 3 series, deciduous. Stamens hypogynous, indefinite, and free, or, in *Fumariæ*, definite, with the filaments usually united. Anthers erect, the cells opening longitudinally. Ovary free, either 1-celled with parietal placentas often protruding into the cavity, or rarely completely several-celled by the placentas meeting in the axis, or 2-celled by a false dissepiment connecting 2 parietal placentas. Style short or none; stigmas as many as placentas, usually confluent and radiating on the disk-like or dilated top of the ovary or style. Ovules indefinite, anatropous, ascending with an inferior micropyle or horizontal. Fruit capsular, usually opening in pores or valves. Seeds globular or subreniform. Embryo minute, at the base of a fleshy albumen.—Herbs or rarely small shrubs, glabrous and often glaucous or hispid, the juice usually coloured. Leaves alternate or the floral ones almost opposite, entire, lobed or dissected

without stipules. Flowers usually solitary on long peduncles, either terminal or in the upper axils.

The Order belongs almost entirely to the temperate or subtropical regions of the northern hemisphere, one only genus being represented by a single species in the southern hemisphere; but, besides the *Papaver rhœas* mentioned below, one at least of the numerous forms of the European *P. officinale* has established itself as a weed of cultivation in some parts of Victoria and S. Australia, as in S. Africa.

1. PAPAVER, Linn.

Sepals 2, rarely 3. Petals 4, rarely 6. Stamens indefinite. Placentas of the ovary 4 or more, covered with ovules and projecting more or less into the cavity, rarely meeting in the centre; stigmas radiating on the convex or almost conical disk-like summit of the ovary. Capsule opening in transverse pores between the placentas under the disk, with very short opercular valves. Seeds furrowed.—Herbs, with a milky juice. Leaves usually lobed or cut. Peduncles long, the buds nodding.

Except the following one, the species are all from the northern hemisphere in the Old World.

1. **P. horridum**, DC. *Syst. Veg.* i. 79. An erect annual, beset with subulate prickles or stiff bristles, but otherwise glabrous and usually glaucous. Leaves narrow-oblong or lanceolate, irregularly pinnatifid and coarsely toothed, the radical ones contracted into a petiole, the stem ones sessile or partially stem-clasping. Flowers small for the genus, of a pale brick or red colour. Sepals hispid. Petals nearly ovate, about $\frac{1}{2}$ in. long. Capsule ovoid-oblong, perfectly smooth and glabrous, the terminal disk at first pyramidal, at length nearly flat, usually with 6, 7, or 8 stigmatic rays. Placentas as many, projecting in the cavity but not meeting in the centre.—F. Muell. Pl. Viet. i. 29; Sw. Brit. Fl. Gard. ii. 173; *P. gariepianum*, DC. *Syst. Veg.* i. 79; Bot. Mag. t. 3623; *P. aculeatum*, Thunb. Fl. Cap. 431.

Queensland. Moreton Bay, F. Mueller; Warwick, Beckler.

N. S. Wales. Hunter's River, R. Brown; Hastings river, Beckler.

Victoria. Sandy localities along the Murray and Snowy rivers, F. Mueller.

S. Australia. Murray scrub, towards Mount Barker and Flinders Range, F. Mueller.

The species is also found in extratropical S. Africa, and is nearly allied to, but I believe really distinct from, some S. European forms of the *P. dubium*, Linn.

P. rhœas, Linn., the common European Corn-Poppy, distinguished by its large red flowers with broad overlapping petals, and a nearly globular or turbinate smooth capsule with about 10 stigmatic rays, has established itself in a few places in Victoria as an introduced weed.

ORDER VIII. CRUCIFERÆ.

Flowers hermaphrodite, regular, or with the outer petals larger. Sepals 4, free, imbricate in 2 series, the outer ones often saccate at the base. Petals 4, rarely wanting, the laminae spreading in the form of a cross; torus usually bearing 4 glands opposite the sepals. Stamens usually 6, of which 2 outer ones shorter or rarely wanting, 4 inner ones longer, in pairs alternating with the outer ones. Anthers 2-celled, attached by the base. Ovary 1-celled, with 2 parietal placentas or rarely a single one, or more frequently divided into two cells by a thin membranous septum connecting the two parietal placentas.

Style simple, often very short or none; stigmas 2, erect or divaricate, or united into a single capitate or minute stigma. Ovules 1, 2, or more in each cell, horizontal or pendulous from the parietal placenta. Fruit a pod, either long and narrow, and then called a *siliqua*, or short and broad, called a *silicle*, usually 2-celled, each cell opening by a deciduous valve, leaving persistent the thin septum surrounded by the nerve-like placentas, which form a rim called the *replum*; exceptionally the pod is 1-seeded and indehiscent, or separating into 2 indehiscent cocci or into 2 or more bead-like articles. Seeds attached in each cell in 2 rows, one proceeding from each edge of the septum, but when each seed is as broad as the cell they overlap each other, so as to appear to be, and to be described as, in a single row; testa cellular, sometimes winged, often exuding when soaked a thick coat of mucilage. Albumen usually none. Embryo usually curved, the cotyledons plano-convex with the radicle curved against their edge, when they are said to be *accumbent*, or over the back of one of them, when they are *incumbent*; in the latter case they are either flat or more or less folded over the radicle, or *conduplicate*.—Herbs or rarely undershrubs, without milky juice. Lairs simple, stellate or attached by the centre. Leaves simple, usually alternate, entire, lobed or pinnately divided, the radical ones often lyrate and the stem ones auricled. Stipules none. Flowers usually in terminal racemes, which are at first corymbose but lengthen out as the fruiting advances, and usually without bracts.

Cruciferae form a very large Order, dispersed over nearly the whole globe, but most abundant in the temperate and cold regions of the northern hemisphere. They are rare within the tropics, especially in districts where there are no high mountain-ranges. The Order is one of the most easily recognized by the flowers or fruits, but, to determine the genera and species, it is absolutely necessary to have the pod and the seed in a good state.

Pods linear, at least 4 times as long as broad.

Pods terete or tetragonous, the valves turgid or with a very prominent midrib.

Seeds in a single row. Pods long.

Cotyledons accumbent 2. BARBAREA.
Cotyledons incumbent 7. SISYMBRIUM.

Seeds in 2 rows. Pods usually short.

Cotyledons accumbent 1. NASTURTIIUM.
Cotyledons incumbent.

Petals either obovate or, if narrow, short and erect 8. BLENNODIA.

Petals tapering into a long, subulate, often twisted point 9. STENOPETALUM.

Pods flattened, usually long, the flat valves parallel with the septum. Cotyledons accumbent.

Stem-leaves auricled.

Seeds smooth 3. ARABIS.

Seeds pitted 4. CARDAMINE.

Stem-leaves divided or rarely entire, not auricled 4. CARDAMINE.

Pods short or oblong, rarely 4 times as long as broad.

Pods terete or globular, the valves very convex.

Cotyledons accumbent 1. NASTURTIIUM.

Cotyledons incumbent.

Fruiting peduncles recurved, pod ripening underground 10. GEOCOCCUS.

Fruiting racemes erect.

Petals tapering into a long, subulate, often twisted point 9. STENOPETALUM.

Petals obovate, or if narrow, erect and short.

Septum broader than the transverse diameter of the pod 8. BLENNODIA.

Septum narrower than the transverse diameter of the pod 12. **CAPSELLA.**

Pods flattened, the flat valves parallel to the septum or to each other.

Cotyledons accumbent. Pod with a septum.

Pod orbicular. Seeds 2 to 4 in each cell 5. **ALYSSUM.**

Pod elliptical. Seeds 10 to 12 or more in each cell 6. **DRABA.**

Cotyledons incumbent. No septum. Seeds numerous, small 11. **MENKEA.**

Pods flattened laterally, the valves boat-shaped, with their flat sides at right angles to the narrow septum.

Seeds 1 in each cell.

Pod either indehiscent or separating into 2 indehiscent cocci. 13. **SENERIERA.**

Pod-valves dehiscent 14. **LEPIDIUM.**

Seeds 2 to 4 or more in each cell.

Cotyledons incumbent. Seeds, or at least ovules, 6 or more in each cell 12. **CAPSELLA.**

Cotyledons accumbent. Seeds or ovules 4 or fewer in each cell 15. **THLASPI.**

Besides the above genera, the following *Cruciferae* have appeared as introduced weeds of cultivation.

Heliophola pumila, Linn. f., from South Africa, a slender, glabrous, erect annual, with linear or filiform leaves, small white flowers, and slender moniliform pods with flat orbicular seeds, and long, linear, twice-folded cotyledons. Received from Swan River.

Brassica?, apparently *B. geniculata* (*Sinapis geniculata*, Desf.), a Mediterranean species, in Herb. Mueller, from Moreton Bay, but the specimens are too young to determine.

Raphanus sativus, Linn., the common cultivated Radish of Europe and Asia, has established itself as a weed in many cultivated places.

Sinapis hastata, Desf. Cat. Hort. Par. ed. 2, 151; DC. Prod. i. 220, described from a specimen raised in the Jardin des Plantes, supposed to have been of Australian origin, is *Diplotaxis virgata*, DC., a Spanish plant.

1. **NASTURTIIUM**, R. Br.

Sepals short, equal, spreading. Petals scarcely clawed. Pods nearly cylindrical, short or elongated, the valves convex, slightly 1-nerved, the septum transparent; style short or long, with an entire or 2-lobed stigma. Seeds usually distinctly ranged in 2 rows, small, turgid, with short free funicles. Cotyledons accumbent.—Herbs, either glabrous or pubescent, with simple hairs. Leaves entire, lobed, or pinnately divided. Flowers small, generally yellow.

A considerable genus, dispersed over the greater part of the globe, and very difficult, both as to the discrimination of its species and as to its distinction from other genera. The Australian species is one of the most widely diffused.

Flowers yellow 1. *N. palustre*.

Flowers white.

Half aquatic perennial. Petals obovate *N. officinale* (below).

Small annual. Petals very small and narrow *Cardamine eustylis* (p. 71).

N. officinale, R. Br. in DC. Prod. i. 137, the European Watercress, with pinnate leaves and perfectly distinct segments and white flowers, has been noticed in a few streams in Victoria and South Australia, but everywhere its importation from Europe could be traced (*F. Mueller*).

1. **N. palustre**, DC. *Syst. Veg.* ii. 191. An erect or decumbent or almost trailing annual or biennial, from a few inches to 2 ft. or more in length, quite glabrous or very rarely pubescent. Leaves toothed or pinnately lobed, or the lower ones sometimes lyrate, auriculate at the base, the lobes

ovate, oblong, or rarely lanceolate, always irregular, confluent and usually sinuate or toothed. Racemes short, loose, without bracts. Flowers small, yellow, the petals scarcely exceeding the calyx. Style short. Pod sessile, turgid, oblong, obtuse, straight, or slightly curved, generally 2 to 4 lines long and about $1\frac{1}{2}$ lines broad, but occasionally rather longer and narrower. —Reichb. Ic. Fl. Germ. ii. 53; *N. terrestre*, R. Br. in Ait. Hort. Kew. ed. 2, iv. 110; Hook. f. Fl. Tasm. i. 21; F. Muell. Fl. Vict. i. 31; *N. semipinnatifidum*, Hook. Journ. Bot. i. 246.

Queensland. Bardekin river, *F. Mueller*; Maranoa river, *Mitchell*.

N. S. Wales. Port Jackson, *R. Brown*; native cabbage of the settlers, *Herb. Moench*; Darling river, *F. Mueller*.

Victoria. Around swamps, lakes, and along the banks of rivers in many localities, *F. Mueller*.

Tasmania. Abundant on the wet banks of St. Patrick's river and on the Derwent river, *J. D. Hooker*.

S. Australia. Torrens river, near Adelaide, *F. Mueller*.

The specimen from the Darling river has narrow lobes to the almost twice pinnatifid leaves, but has the normal short pods of the species. Some specimens from the Murray river have also very narrow leaf-lobes, with a longer and more slender pod, almost like that of *N. indicum*, but not quite ripe. Mitchell's specimen has very young but slender pods, and the whole plant is hoary pubescent, and it may possibly not be correctly referred here. The species is dispersed over all temperate and subtropical regions of the globe except S. Africa. It was first published by Leysser as *Sisymbrium palustre*, and a year later by Withering as *S. terrestre*. Brown first transferred it to *Nasturtium* with Withering's specific name, and De Candolle soon afterwards with Leysser's name. Continental botanists now generally adopt *N. palustre*, DC., as the oldest absolute specific name, whilst British botanists often adopt *N. terrestre*, Br., as the oldest in the genus.

2. BARBAREA, R. Br.

Sepals nearly erect, equal. Petals clawed. Pod elongated, flattish-tetragonous; septum transparent; valves keeled or with a prominent midrib; style short; stigma capitate or 2-lobed. Seeds in a single row, oblong, not bordered; the funicles free.—Erect, branching, usually glabrous herbs, annual or biennial, the stem angular. Leaves entire or pinnately sinuate or lobed. Flowers yellow, sometimes bracteate. Pods usually rigid.

A genus of few species, dispersed over the temperate regions of the globe, the Australian species being the commonest over the whole range. It differs from *Nasturtium* chiefly in the robust rigid habit, the prominent midrib of the valves, and the seeds occupying the whole breadth of the pod so as to appear in a single row.

1. ***B. vulgaris***, R. Br.; DC. *Prod.* i. 140. Erect, rather rigid, but often slightly branching, $1\frac{1}{2}$ to 2 ft. high. Leaves lyrate-pinnatifid, the lower ones with a large terminal ovate lobe and several smaller ones more or less distinct, the upper ones often reduced to a single ovate or oblong terminal lobe, usually sinuate or toothed. Flowers bright yellow, the petals twice as long as the calyx. Pods usually numerous, in a long terminal raceme, on slightly spreading pedicels of 3 to 4 lines, in the Australian specimens usually 1 to $1\frac{1}{2}$ in. long, the stigma nearly sessile or on a short style rarely exceeding $\frac{1}{2}$ line. —A. Gray, Gen. III. t. 62; F. Muell. Pl. Vict. i. 32; *B. australis*, Hook. f. Fl. Nov. Zel. i. 14; Fl. Tasm. i. 21.

Victoria. Banks of the Mitta Mitta and other rivers of Gipps' Land, chiefly at an elevation of 1000 to 3000 feet, *F. Mueller*.

Tasmania. Moist or marshy districts in the centre of the island, also near Launceston, *J. D. Hooker*.

The species is spread over Europe, North America, northern Asia, the Himalayas, and New Zealand, and as an introduced weed in South Africa. In Australia it is evidently indigenous. The specimens all belong to the var. *stricta* of most northern botanists (*B. procor.* Hook. Fl. Bor. Am. i. 39, not of R. Br.), as usually defined, with nearly erect stout pods with a very short style. European specimens are often precisely similar.

3. *ARABIS*, Linn.

(*Turritis*, Linn.)

Sepals rather short, equal or the lateral ones saccate at the base. Petals entire, usually clawed. Pod sessile, elongated, slender, flattened; valves flat, keeled, or with a midrib; septum membranous; stigma entire or 2-lobed. Seeds in 1 or rarely 2 rows, flattened, often bordered or winged. — Annual or perennial herbs, glabrous or tomentose with spreading, branched, or stellate hairs. Radical leaves usually spatulate, the stem ones sessile, often auricled. Flowers white or rarely purple, straw-coloured or pink.

The species are numerous in the temperate and colder regions of the northern hemisphere, very few inhabiting the southern one; and none are peculiar to Australia. *Cardamine stylosa*, which in its undivided sagittate leaves comes very near to *Arabis*, may be readily distinguished by its reticulate pitted seeds.

1. *A. glabra*, *Craetz*; *Hook. f. and Thoms. in Journ. Linn. Soc.* v. 140. Stem erect, simple, rigid, 1 to 3 ft. high, usually glabrous except at the base. Radical leaves petiolate, narrow-oblong, entire, or sinuately toothed, 2 to 4 in. long, usually pubescent or hirsute with stellate or branching hairs; stem-leaves erect, oblong-lanceolate, stem-clasping and usually auriculate at the base, and all except the lowest quite glabrous. Flowers rather small, white or straw-coloured. Fruiting racemes long, rigid, with numerous erect slender pods, mostly 2 in. long or even more, and $\frac{1}{2}$ to $\frac{3}{4}$ line broad. Seeds small, either as broad as the septum and in 1 row, or narrower and somewhat biserial. — *Turritis glabra*, Linn.; DC. Syst. Veg. ii. 211; Reicheb. Ic. Pl. Germ. ii. t. 44; F. Muell. Pl. Vict. i. 33 and 221.

N. S. Wales. On the Severn, in New England, *C. Stuart*.

Victoria. Banks of the Cobougra, Mitta Mitta, Livingstone Creek, and Snowy rivers, at an elevation of 3000 to 4000 feet, *F. Mueller*.

The range of this species extends over Europe, temperate North America and Asia, the Himalaya, and Japan.

4. *CARDAMINE*, Linn.

Sepals equal at the base. Petals clawed. Pod elongated, linear, compressed; valves usually flat, without conspicuous nerves, opening elastically; septum transparent; style short or long; stigma entire or 2-lobed. Seeds flattened, not bordered, in a single row (except in *C. eustylis*). — Herbs, usually flaccid and glabrous. Leaves entire or more frequently pinnately divided, in a few species not Australian opposite or whorled. Flowers erect or nodding, white, purple, or lilac, not yellow. Pods usually slender.

A large genus, widely spread over the temperate and colder regions both of the northern and southern hemisphere. Of the 7 following species two are identical with or representatives of common northern species, the remainder are endemic or extend only to New Zealand.

Seeds reticulate and pitted, rather large.

Leaves entire or sinuate-toothed, the stem ones sagittate.

Plant of 2 to 5 ft. 1. *C. stylosa*.

Lower leaves pinnate, all petiolate. Plant erect, under 2 ft. 2. *C. dictyosperma*.
Seeds smooth.

Perennials.

Fruiting racemes short, leafy. Pod fully 2 lines broad 3. *C. radicata*.

Fruiting racemes loose, leafless. Pod not above 1 line broad.

Flowers rather large, with obovate spreading petals.

Style 1 to 1½ line long 5. *C. tenuifolia*.

Stigma sessile or nearly so 6. *C. hirsuta heterophylla*.

Flowers very small, with narrow erect petals 4. *C. laciniata*.

Annuals.

Petals conspicuous, obovate, spreading 6. *C. hirsuta heterophylla*.

Petals very narrow, small, nearly erect.

Seeds nearly the breadth of the septum, in a single row 6. *C. hirsuta*.

Seeds numerous, small, almost biscriate. Valves of the pod convex 7. *C. eustylis*.

1. ***C. stylosa***, DC. *Syst. Veg.* ii. 248. A rather coarse glabrous herb, branching and decumbent or nearly erect, usually 2 to 3 ft. high and sometimes attaining 5 ft. Leaves oblong-lanceolate, entire or sinuate, and minutely but remotely toothed, the lower ones narrowed into a long petiole, the upper ones sessile but narrow below the middle and clasping the stem by their sagittate base, the longest 3 to 5 in. long. Flowers small, white, with obovate spreading petals. Fruiting racemes long and rather rigid, the pedicels very spreading, 3 to 4 lines long. Pods 1 to 1½ in. long and ¾ to 1 line broad, with a very faint nerve on the valves. Seeds oval, dark-coloured, reticulated with raised longitudinal nerves and transverse pits between them.—Hook. f. *Fl. Tasm.* i. 18; F. Muell. *Pl. Vict.* i. 34; *Arabis gigantea*, Hook. *l.* t. 259; *C. divaricata*, Hook. f. *Fl. Nov. Zel.* i. 13.

N. S. Wales. Mount Lindsay, *W. Hill*.

Victoria. Moist forest valleys, rare in open pasture land near the banks of rivers in various parts of Gipps' Land, also in the Dandenong ranges, *F. Mueller*.

Tasmania. Northern and eastern coasts near the sea, *J. D. Hooker*; ascending to alpine elevations on Mount Wellington, *Oldfield*; also in New Zealand.

This species has as much the characters of *Arabis* as of *Cardamine*, but the habit is rather that of the latter genus.

2. ***C. dictyosperma***, Hook. *Journ. Bot.* i. 246. Erect or branching and decumbent at the base, glabrous or with a few hairs at the base, under 2 ft. high. Lower leaves pinnately divided into a few distant, ovate or oblong, entire or toothed segments, the terminal one usually much the largest; upper leaves with narrower and fewer lobes, or small, narrow, and entire, all petiolate, with the petiole scarcely dilated at the base and rarely sagittate. Flowers larger than in *C. stylosa*, the lamina narrow-obovate, usually longer than the claw. Fruiting racemes long, the pedicels very spreading, 2 to 5 lines long. Pod usually longer and more slender than in *C. stylosa*, and sometimes attaining 2 in. but sometimes only 1 in.; style from ¾ to 2 lines long. Seeds of *C. stylosa*, but with coarser reticulations.—Hook. f. *Fl. Tasm.* i. 19; F. Muell. *Pl. Vict.* i. 35 and 221; *C. nivea*, Hook. *Comp. Bot. Mag.* i. 273.

N. S. Wales. Moist rocky places north of Bathurst, *A. Cunningham*; Severn river New England, *C. Stuart*; from Clarence river, *Beckler*, to Twofold Bay, *F. Mueller*.

Victoria. Springy shady localities in damp valleys, from the lowlands to the alps, *F. Mueller*.

Tasmania. Abundant in damp ravines and by waysides throughout the island, *J. D. Hooker*.

W. Australia, Drummond, n. 94, and 5th Coll. n. 285.

In flower the smaller specimens often resemble *C. tenuifolia*, but are more erect and less branched. The seeds are very different.

3. **C. radicata**, *Hook. f. in Hook. Ic. Pl. i. 882.* Rhizomes or procumbent root-like stems elongated, cylindrical and brittle, sometimes as thick as the little finger, producing at their extremity tufts of leaves and leafy erect flowering branches 2 to 6 in. high. Leaves petiolate, obovate, coarsely toothed or almost pinnatifid, not auricled at the base, glabrous as well as the whole plant. Flowers (which I have not seen) rather large. Fruiting racemes short and dense, often leafy at the base. Pod usually $\frac{3}{4}$ in. long and fully 2 lines broad. Seeds much compressed, irregularly orbicular, not pitted. —*Hook. f. Fl. Tasm. i. 18.*

Tasmania. Summit of Mount Olympus, in crevices of basaltic columns, *Gunn*; in crevices of rocks on a mountain westward of Mount Lapeyrouse, *Herb. F. Mueller*.

4. **C. laciniata**, *F. Muell. in Trans. Phil. Soc. Vict. i. 34, and Pl. Vict. i. 35.* A glabrous perennial, with a procumbent or creeping rhizome, much more slender than in *C. radicata*, the stems rather weak, ascending or erect, seldom above 1 ft. high and often leafless. Leaves chiefly radical, petiolate, linear-lanceolate or rarely obovate-oblong, pinnatifid with a few narrow lobes, or with 1 large terminal lobe and 2 or 3 smaller ones along the petiole, or rarely entire or toothed only, the stem-leaves when present few and narrow. Flowers very small, the narrow erect petals scarcely longer than the calyx. Stamens usually 4 only. Fruiting raceme very loose, with distant, slender, spreading pedicels. Pods slender, 1 to $1\frac{1}{2}$ in. long. Seeds orbicular, not pitted.

N. S. Wales. New England, near Clifton, *C. Stuart*.

Victoria. In marshy places, chiefly in rich soil, not rare. Used as food by the Murray natives, *F. Mueller*.

S. Australia. Lake Alexandrina, Gawler river, Bugle range, the Onkaparinga and Torrens rivers, etc., rather frequent, *F. Mueller*.

5. **C. tenuifolia**, *Hook. Journ. Bot. i. 247.* Generally if not always perennial, with a slender creeping rhizome, which often dies away so as to give the tufts the appearance of an annual. Stems weak, branching and glabrous or rarely hirsute, like those of *C. hirsuta* but usually longer, sometimes attaining 1 to $1\frac{1}{2}$ ft. Leaves pinnately divided, the lower ones usually with a terminal, broadly ovate, orbicular, or cordate segment, entire or coarsely toothed, the lateral segments smaller, few, distant, and all petiolate, the upper leaves or sometimes all the stem-leaves with narrow-linear segments, more numerous and more equal than in the lower ones, and usually entire and sessile; in some specimens the leaves are all crowded at the base of the otherwise leafless scapes. Flowers rather large, white or lilac, the laminae of the petals obovate and spreading. Fruiting racemes loose, the pedicels not very spreading. Pods usually erect, narrow, $\frac{1}{2}$ to 1 in. long, tipped by a slender style often $1\frac{1}{2}$ lines long. Seeds nearly orbicular, smooth. —*C. lilacina*, *Hook.*

Comp. Bot. Mag. i. 273; *C. pratensis*, Hook. f. Fl. Tasm. i. 19; *C. parviflora*, var., F. Muell. Pl. Vict. i. 36.

N. S. Wales. Interior of the colony, *A. Cunningham*; Macquarie river, *Fraser*; Hunter river, *Leichhardt*; Macleay river, *Beckler*.

Victoria. Swamps on Latrobe river, *F. Mueller*.

Tasmania. Common in marshy and wet places throughout the island, *J. D. Hooker*.

This plant is united by Dr. Hooker with the European *C. pratensis*, Linn., and it certainly is a very close representative of that species, but its lax, more branching stems, give it much more the habit of *C. hirsuta*. In many respects indeed it seems almost to pass into the latter species through its variety *heterophylla*, and F. Mueller unites all these plants with *C. resedifolia*, Linn. and others, under the Linnæan name of *C. parviflora*. But long and repeated observation of the European *C. pratensis*, *resedifolia*, and *hirsuta*, in a living state in various localities, prevents my admitting their union without much more convincing proofs; and, if they are kept distinct, it appears necessary to maintain also the Australian *C. tenuifolia*. It is, I believe, a perennial like *C. pratensis*, but that cannot always be ascertained from dried specimens.

C. intermedia, Hook. Ic. Pl. t. 258, can scarcely be judged of from the single specimen preserved, but the style is certainly rather long and slender, and the habit and petals are more those of *C. tenuifolia* than of *C. hirsuta*.

6. ***C. hirsuta*, Linn.; DC. Prod. i. 152.** A much-branched decumbent or tufted annual, seldom above 6 in. high, either quite glabrous or slightly hirsute with short spreading hairs. Leaves pinnately divided, the lower ones with 1 ovate or rounded terminal segment and a few smaller petiolulate lateral ones, or sometimes reduced to the terminal one, the upper leaves few with narrow lobes. Flowers very small, the petals narrow and erect or scarcely spreading. Stamens often reduced to 4 (especially in European specimens). Fruiting racemes usually short and rather dense, the pedicels not very spreading. Pods erect, slender, usually 7 to 9 lines long and scarcely more than $\frac{1}{2}$ line broad, the stigma sessile or on a style not longer than the breadth of the pod. Seeds smooth, as broad as the septum, and in a single row as in all the preceding species. — *Reichb. Ic. Fl. Germ. ii. t. 26*; Hook. f. Fl. Tasm. i. 20; *C. parviflora*, Linn.; DC. Prod. i. 152; also F. Muell. Pl. Vict. i. 36, partly; *C. debilis*, Banks, in DC. Syst. Veg. ii. 265; *C. paucijuga*, Turcz. in Bull. Mosc. 1854, ii. 295.

N. S. Wales. Apparently common in wet places, extending northwards to Hastings river, *Beckler*.

Victoria. Wet meadows and along streams, dispersed over the whole colony, *F. Mueller*.

Tasmania. Throughout the island; abundant in many localities, *J. D. Hooker*.

S. Australia. As far as Flinders Range, *F. Mueller*.

W. Australia, *Drummond, Ath. Coll. n. 131.*

The species is very abundant in the temperate regions of the northern hemisphere, in the hilly regions of the tropics, in New Zealand and the Pacific islands, and in Antarctic America. Always in the north a small-flowered annual, and sometimes glabrous. Many of the Australian specimens are precisely like the glabrous European ones, but in others there are signs of a procumbent slender rhizome, as is so frequent in the following variety or species. I have preserved the name *C. hirsuta*, in place of that of *C. parviflora* adopted by F. Mueller, because it is the one by which the plant is most universally known, both being Linnæan.

Var. (f) *heterophylla*. Rhizome apparently in some instances perennial, though very slender. Flowers rather larger, with more spreading almost obovate petals. Pod less slender, and the whole plant approaching *C. tenuifolia* in habit, but with an almost sessile stigma, as in *C. hirsuta*. — *C. heterophylla*, Hook. Ic. Pl. t. 58. — Apparently a common Tasmanian

form, and would include some Victoria specimens, *Robertson*, and South Australian ones from Mount Barker creek, *P. Mueller*.

7. **C. (?) eustylis**, *F. Muell. in Trans. Vict. Inst.* i. 114; *Pl. Vict.* i. 37. An erect annual, much branched from the base, scarcely exceeding 6 to 8 in. in height and quite glabrous. Leaves pinnately divided, the lower ones with ovate segments, the others with narrower ones, all usually with a few teeth or lobes. Flowers smaller than in *C. hirsuta*, the petals narrow, erect, and scarcely exceeding the calyx. Fruiting racemes short, leafless. Pods rather spreading, slender, 6 to 9 lines long, tipped by a style of $\frac{1}{2}$ to near 1 line, the valves convex, smooth, without nerves. Seeds very numerous and small, much narrower than the septum, and showing 2 distinct rows.

N. Australia. On the rivers flowing into the Gulf of Carpentaria, rare, *P. Mueller*.

Victoria. Sandy and gravelly banks of the Murray river, *P. Mueller*.

The nearly cylindrical pod and two-rowed seeds are more those of *Nasturtium* than of *Cardamine*, but the habit and white flowers may justify the placing the species in the latter genus. The degree of elasticity of the valves cannot be judged of in the dried specimens.

5. ALYSSUM, Linn.

(*Meniocus*, *Desv.*)

Sepals rather short, equal at the base. Petals rather short, entire or bilid. Stamens often bearing a tooth or small appendage on the filaments of some or all of them. Pod short, from nearly orbicular to oblong, very flat or turgid; the valves flat, concave, or turgid in the centre and flat on the margins, the septum membranous; style short or long, with an entire stigma. Seeds 2 to 10 in each cell. Cotyledons accumbent.—Branching herbs or small shrubs, usually hoary with stellate tomentum. Leaves undivided, usually linear. Racemes without bracts, with white or yellow flowers.

A large genus, dispersed over the temperate regions of the Old World, but chiefly in the Mediterranean region and western Asia. None are found in America, eastern Asia, or in the Pacific Islands. The only Australian species is identical with one common in the eastern Mediterranean region.

1. **A. linifolium**, *Steph. in Willd. Spec. Pl.* iii. 167. A small, but hard, wiry, and much-branched erect annual, hoary, with a minute, close, stellate tomentum. Leaves linear, oblong-spathulate or almost obovate, mostly under $\frac{1}{2}$ in., but the longest sometimes nearly 1 in. long, quite entire. Flowers white, very small. Pods orbicular or broadly ovate, 2 to 3 lines long, minutely hoary; the valves flat and without nerves; style small, subulate. Seeds 4 to 6 in each cell.—*Meniocus linifolius*, DC. *Syst. Veg.* ii. 325; Deless. *Ic. Sel.* ii. t. 42; *M. serpyllifolius*, Desv.; DC. l. c.; *M. australasicus*, Turcz. in *Bull. Mosc.* 1854, ii. 297.

N. Australia. Laerosse Island, Cambridge Gulf, N. W. coast, *A. Cunningham*. A single specimen, with only portions of the pods remaining, but apparently belonging to this species.

N. S. Wales. Darling river, *Victorian Expedition*.

Victoria. Murray river, and sand-hills near Lake Hindmarsh, *F. Mueller*.

S. Australia. Near Crystal Brook and about Spencer's Gulf, *F. Mueller*.

W. Australia. *Drummond*, 4th Coll. n. 127.

This, the only outlying representative of a genus otherwise so restricted in its range,

may possibly have been introduced from southern Europe, but it appears to be too abundant in arid desert situations to be omitted from the Flora.

6. *DRABA*, Linn.

Sepals short, equal. Petals entire. Pod elliptical or oblong, rarely almost linear, compressed, several-seeded; valves flat or nearly so, very rarely nerved; septum membranous; style short or long; stigma entire. Seeds in 2 rows, not bordered, with filiform funicles; cotyledons accumbent.—Herbs, usually small and tufted or annual, more or less hoary, with stellate tomentum. Leaves undivided and usually entire, the radical ones rosulate. Scapes leafless or flowering-stems with sessile leaves. Racemes without bracts. Flowers usually small, white or yellow, rarely pink or purple.

A large genus, chiefly distributed over the temperate and cooler regions of the northern hemisphere, very abundant in high alpine stations, and extending all along the high Andes of South America, rare in Antarctic America, entirely wanting in South Africa and New Zealand, and represented in Australia by a single species identical with a common northern one.

1. *D. muralis*, Linn.; DC. Prod. i. 171. A slender erect annual, 2 to 3 in. high and simple, or twice as high and branched, more or less pubescent with stellate hairs. Leaves ovate, coarsely toothed, $\frac{1}{4}$ to $\frac{1}{2}$ in. long in Australian specimens, often twice that in European ones, the radical ones petiolate, the others sessile. Flowers very small, white or pale yellow. Fruiting racemes loose, with slender spreading pedicels of 4 to 5 lines. Pod elliptical, pubescent in our specimens, about 3 lines long, containing usually above 12 seeds in each cell.—*D. nemoralis*, Ehrh.; DC. Prod. i. 171; Reichb. Ic. Fl. Germ. ii. t. 12; Hook. f. Fl. Tasm. i. 24.

Tasmania. Dry places near Hobarton, and on the Derwent at the Cataracts, *J. D. Hooker*.

Common in the temperate regions of the greater part of Europe and Asia, and also in some parts of North America. The usual variety in the north has glabrous pods; but the Tasmanian variety with pubescent ones, to which the name of *D. nemoralis* has been given, is also found in Europe.

7. *SISYMBRIUM*, Linn.

Sepals equal or the lateral ones slightly saccate. Petals usually elongated, with long claws. Pod linear-elongated, cylindrical or flattened, several-seeded, the valves usually convex and 3-nerved; septum membranous; style usually short, with an entire or slightly 2-lobed stigma. Seeds in a single row, not bordered, oblong, with filiform funicles. Cotyledons incumbent.—Herbs, usually annual or biennial, glabrous hirsute or tomentose. Leaves entire or pinnately lobed or divided. Flowers yellow, or rarely white or pink.

A large genus, chiefly European and Asiatic, with a few North American and a very few Antarctic species. Only one is a native of New Zealand, and none are as yet known to be truly indigenous in Australia; but the following appears now so well established as a roadside weed that it cannot be omitted from the Flora.

*1. *S. officinale*, Scop.; DC. Prod. i. 191. An erect annual, more or less pubescent, a foot high or rather more, with very rigid spreading branches. Leaves deeply pinnatifid, with few lanceolate slightly toothed lobes, the terminal one 1 to $1\frac{1}{2}$ in. long, the others smaller, often curved backwards towards



the stem, the upper leaves sometimes undivided and hastate. Flowers very small, yellow. Pods about $\frac{1}{2}$ in. long, thick at the base, tapering to the point, more or less hairy, almost sessile, and closely pressed against the axis in long, slender, stiff racemes.—Reichb. Ic. Fl. Germ. ii. t. 72.

S. Australia. Abundant on roadsides and waste places about Adelaide, *F. Mueller* and others.

W. Australia, Dynamical. In both colonies, introduced from Europe. The species is somewhat anomalous in the genus, the valves of the pod having a somewhat prominent midrib, and the seeds in the lower broader part showing two almost distinct rows.

8. BLENNODIA, R. Br.

Sepals short, open, equal at the base or slightly saccate. Petals obovate, or short and narrow. Pod linear or linear-oblong (short in a variety of *B. trisecla*), terete or 4-angled, the valves very convex, without nerves or with a prominent midrib; septum membranous or almost spongy; stigma capitate, sessile or on a very short style. Seeds oblong or ovoid, more or less distinctly 2-rowed, not bordered, when soaked usually emitting a copious fibrous mucus; funicles free, filiform. Cotyledons incumbent. Herbs or low undershrubs, glabrous or hoary-tomentose with simple or stellate hairs. Leaves entire or pinnatifid. Flowers white, yellow, or pink, the racemes without bracts.

A genus limited to extratropical or subtropical Australia, differing from *Sisymbrium*, to which some species have been referred, in the seeds never so completely overlapping each other as to form a single row, and generally in the copious mucus of the seeds, which is however not constant in all the species. From *Capsella* it differs in the longer pod, and in the dissepiment broader in proportion to the transverse diameter of the pod.

• *Glabrous undershrubs. Leaves or their lobes linear-filiform. Pods slender.*

- | | |
|---------------------------------|-------------------------|
| Leaves entire | 1. <i>B. filifolia.</i> |
| Leaves mostly 3-cleft | 2. <i>B. trisecla.</i> |

Annuals, glabrous or with simple hairs. Leaf-lobes narrow.

Pods slender, scarcely contracted at the base.

- | | |
|------------------------------------|-----------------------------|
| Glabrous | 3. <i>B. nasturtioides.</i> |
| Hoary, with simple hairs | 4. <i>B. eremigera.</i> |

Annuals, with stellate pubescence. Leaves pinnatifid or toothed.

Pods acute at the top and at the base; valves very convex.

- | | |
|---|-----------------------------|
| Pod rather slender, glabrous | 5. <i>B. cardaminoides.</i> |
| Pod thicker in the middle, hirsute or stellately tomentose. | |

Petals scarcely exceeding the calyx.

Flowers yellow. Pedicels about as long as the pod . . . 6. *B. curvipes.*

Flowers white. Pedicels much shorter than the pod . . 7. *B. brevipes.*

Petals twice as long as the calyx, white or pink.

Calyx about 1 line long 8. *B. lasiocarpa.*

Calyx $2\frac{1}{2}$ lines long 9. *B. canescens.*

Perennials, with stellate pubescence. Leaves toothed or pinnatifid. Pods acute at the top and at the base; valves very convex.

- | | |
|---|-----------------------------|
| Hoary. Pod at least 5 times as long as broad | 10. <i>B. Cunninghamii.</i> |
| Nearly glabrous. Pod about 3 times as long as broad . . . | 11. <i>B. alpestris.</i> |

1. **B. filifolia, Benth.** Shrubby at the base and perfectly glabrous, like the *B. trisecla*. Leaves solitary or clustered, linear-filiform, entire, mostly $\frac{1}{2}$ to 1 in. long. Flowers not seen. Fruiting racemes rather rigid with spread-

ing pedicels of 4 to 5 lines. Pods shortly stipitate above the calyx-scar, slender, straight or slightly curved, seldom above $\frac{1}{2}$ in. long, the stigma raised on a very short style; valves prominently 1-nerved. Seeds obovate, rather larger than in *B. trisecta*, emitting a rather copious mucilage.—*Erysimum filifolium*, F. Muell. in *Linnaea*, xxv. 368; *Sisymbrium filifolium*, F. Muell. in *Trans. Phil. Soc. Vict.* i. 34.

S. Australia. Crystal Brook, F. Mueller.

2. **B. trisecta**, Benth. A perfectly glabrous often glaucous undershrub or almost a shrub, 1 to several ft. high. Leaves numerous, often clustered, linear-filiform, sometimes rather thick, divided into 3 (rarely 2 or 5) unequal linear-filiform segments, the whole leaf seldom above 1 in. long, except in very luxuriant specimens. Flowers white, scented. Sepals 1 to $1\frac{1}{2}$ lines long. Petals obovate, spreading. Fruiting raceme 4 to 6 in. long or rarely more, with slightly spreading pedicels of $\frac{1}{4}$ to $\frac{1}{2}$ in. Pod sessile on the pedicel, usually narrow-linear, 4 to 6 lines long, but sometimes very short, straight or curved, the stigma sessile or nearly so; valves convex, with a slender longitudinal nerve. Seeds numerous, small, oblong-ovoid, those which I have soaked scarcely emitting any mucus.—*Sisymbrium trisectum*, F. Muell. in *Trans. Vict. Inst.* i. 114; *Pl. Vict.* i. 39.

N. S. Wales. Scrub near the Gwydir river, Mitchell; Darling river, F. Mueller.

Victoria. Sandy clay-soil and dry limestone plains of the Murray, F. Mueller.

S. Australia. Flinders Range, Murray river, and in the interior N.W. of Spencer's Gulf, F. Mueller; Cooper's Creek, Leichhardt.

Var. *brachycarpa*. These specimens, collected in M'Donald Stuart's Expedition, are in fruit only; the habit and foliage are precisely those of the common form gathered with them, but the pods are shortly oblong and very turgid, about 2 lines long; they may possibly be accidentally abnormal.

3. **B. nasturtioides**, Benth. A glabrous annual, the central scape erect and leafless, the lateral branches decumbent at the base and leafy, from 2 or 3 in. to nearly 1 ft. long. Leaves usually pinnately divided into a few linear rather thick segments, the radical ones often 2 in. long, the others much smaller. Flowers yellow, rather small. Fruiting racemes loose, 3 to 6 in. long, with slender pedicels. Pod narrow, 4 to 7 lines long, nearly straight and scarcely contracted at the base; stigma sessile or nearly so; valves slightly convex, the longitudinal nerve very slender and sometimes quite inconspicuous. Seeds small, ovate, emitting a considerable mucus when soaked.—*Erysimum nasturtium*, F. Muell. in *Linnaea*, xxv. 368; *Sisymbrium nasturtioides*, F. Muell. in *Trans. Vict. Inst.* i. 115; *Pl. Vict.* i. 39.

N. S. Wales. Inundated plains on Lachlan river, A. Cunningham.

Victoria. Plains of Murray river, towards the junction of the Darling, F. Mueller.

S. Australia. Hill, Hutt, and Rocky rivers, F. Mueller.

Var. *pinnatifida*. Leaves small, on long petioles, with few short lateral lobes and a larger terminal one. Between Darling and Lachlan rivers, Burkitt, small specimens in fruit only, the leaves mostly withered.

4. **B. eremigera**, Benth. Annual and erect or branching and decumbent at the base, more or less hairy with short simple hairs, from a few in. to $1\frac{1}{2}$ ft. high. Leaves deeply and irregularly pinnatifid, with few oblong-linear or linear, sometimes falcate lobes. Flowers small, yellow. Fruiting racemes

loose, 2 to 4 in. long, with slender spreading pedicels. Pods like those of *B. nasturtioides*, mostly about $\frac{1}{2}$ in. long, slender, straight or curved, not contracted at the base; stigma sessile or nearly so; valves with a slender nerve. Seeds small, oblong-ovate, emitting mucus when soaked.—*Sisymbrium eremigerum*, F. Muell. *Fragm.* ii. 143.

Queensland. Maranoa river, *Mitchell*.

N. S. Wales. Darling river, *Victorian Expedition*.

5. ***B. cardaminoides***, F. Muell. *Herb.* (as a *Sisymbrium*). A slender or small annual like *B. nasturtioides*, but more or less clothed with a minute stellate pubescence, sometimes scarcely visible without a lens. Leaves pinnatifid, the radical ones with rather numerous small, ovate triangular or lanceolate lobes, the terminal ones confluent, the lower ones becoming distinct segments along the petiole; stem-leaves few and small, with few short lobes. Flowers white (or pink?), the sepals barely 1 line long. Petals obovate, twice as long. Fruiting raceme loose and slender, 2 to 4 in. long, with slender spreading pedicels. Pod 4 to 6 lines long, scarcely 1 line broad, usually curved, narrowed towards the base, glabrous or with a very minute stellate tomentum; valves very convex and keeled. Seeds small, ovate, emitting mucus when soaked.

N. S. Wales. Darling river, *Victorian Expedition*.

Victoria. Sand-ridges and heaths on the Glenelg, F. Mueller, *Robertson*.

S. Australia. Near Wellington, and other places near the mouth of the Murray, F. Mueller.

Some imperfect dry specimens have a slight resemblance with the European *Sisymbrium Thalianum*, to which F. Mueller was disposed to refer them, but the latter plant is really very different, having the undivided leaves, the flattened pods, the single-rowed seeds, and the whole habit of an *Arabis*, with the cotyledons less decidedly incumbent than in other *Sisymbria*.

6. ***B. curvipes***, F. Muell. in *Trans. Phil. Soc. Vict.* i. 100, and *Pl. Vict.* i. 42. A small but rather coarse annual, branching from the base, seldom above 6 to 8 in. high, hoary with a rather rough stellate or branching pubescence. Leaves oblong-lanceolate or broadly linear, coarsely toothed or entire, the radical ones about 1 in. long and narrowed into a petiole, the upper ones smaller. Flowers small, yellow, the petals scarcely longer than the calyx. Fruiting racemes loose, 2 to 4 in. long. Pedicels spreading or curved, 4 to 6 lines. Pod curved, 4 to 5 lines long, turgid, $1\frac{1}{2}$ line thick in the middle, tapering into a short style at the top, contracted at the base, pubescent with short stellate hairs; valves very convex and keeled. Seeds few, ovate, exuding mucus when soaked.—*Erysimum curvipes*, F. Muell. in *Linnaea*, xxv. 368.

Victoria. Sandy localities on the Murray, towards the junction with the Darling, F. Mueller.

S. Australia. Crystal Brook, to the N. W. of Lake Torrens, and about Spencer's Gulf, F. Mueller.

7. ***B. brevipes***, F. Muell. in *Trans. Phil. Soc. Vict.* i. 100, and *Pl. Vict.* i. 41. A coarse branching annual of 1 to 2 ft., hoary with a short stellate or branching pubescence. Leaves lyrate-pinnatifid, 1 to 2 in. long, petiolate, with triangular or lanceolate lobes, entire or scarcely toothed; the upper leaves smaller and toothed only. Flowers very small, white, the petals scarcely exceeding the calyx. Fruiting racemes rigid, 3 to 4 in. long, with

erect, rigid pedicels of 1 to 2 lines. Pods mostly about $\frac{1}{2}$ in. long, turgid, somewhat curved, tapering into a short style at the top, contracted at the base, pubescent with stellate hairs; valves very convex, but the midrib scarcely conspicuous except at the base. Seeds few, ovate, large, but distinctly ranged in 2 rows, the mucus very copious, with radiating fibres.—*Erysimum brevipes*, F. Muell. in *Linnaea*, xxv. 367.

Victoria. Barren sandy localities on the Murray and its lower tributaries, F. Mueller.

S. Australia. Rocky River, and to the N. W. of Lake Torrens, F. Mueller.

W. Australia. South coast?, Drummond, n. 128.

8. **B. lasiocarpa**, F. Muell. in *Trans. Phil. Soc. Vict.* i. 100, and *Pl. Vict.* i. 40, t. 2. An annual, hoary with stellate pubescence, the central scape short and erect, the lateral stems decumbent and leafy at the base, branching and attaining 1 ft. or more. Radical leaves petiolate, lyrate-pinnatifid, 1, 2, or even 3 in. long; stem-leaves smaller, pinnatifid, or the upper ones toothed only. Flowers pink or white. Calyx about 1 line, petals obovate, fully twice as long. Fruiting racemes loose, 2 to 4 in. long, with divaricate pedicels of 4 to 6 lines. Pods not above $\frac{1}{2}$ in. long, turgid, curved, tapering at the top with a short slender style, contracted at the base, hispid with simple or stellate hairs; valves very convex, with the midrib scarcely conspicuous. Seeds ovate, the mucus copious.—*Erysimum blennodioides*, F. Muell. in *Linnaea*, xxv. 367.

N. S. Wales. Darling river, *Victorian Expedition*.

Victoria. Arid sandy plains on the Murray and its lower tributaries, F. Mueller.

S. Australia. Towards Lake Alexandrina, Hildebrand; Cooper's Creek, A. C. Gregory.

9. **B. canescens**, R. Br. in *App. Sturt. Exped.* 4. Annual, but the lateral branching stems apparently harder at the base at the close of the season, so as to be almost woody; the whole plant hoary with a short, soft, stellate pubescence. Leaves lanceolate or oblong-linear, the radical ones about 2 in. long, pinnatifid and narrowed into a petiole, the upper ones linear, toothed or entire. Flowers large, pink, resembling those of a *Malthiola*. Calyx $2\frac{1}{2}$ lines long, hoary. Petals fully twice as long, with long claws. Fruiting racemes rather loose, 2 to 6 in. long, the pedicels short, slightly spreading. Pod linear, 1 to $1\frac{1}{2}$ in. long, slightly pubescent, with convex valves, crowned by the large, persistent stigma. Seeds oval-oblong, smooth.

N. S. Wales. Darling river, *Victorian Expedition*.

S. Australia. Cooper's River, A. C. Gregory; Elizabeth river, near Lake Torrens, Hergott.

10. **B. Cunninghamii**, Benth. A tufted herbaceous perennial, more or less hoary with soft stellate hairs, occasionally mixed with simple ones; annual stems erect or decumbent at the base, from a few inches to 1 ft. high, slightly branched. Radical leaves petiolate, 1 to 2 in. long, oblong or lanceolate, coarsely toothed or shortly pinnatifid; stem-leaves few and small, from lanceolate to nearly obovate. Flowers small, apparently white. Fruiting racemes loose, 2 to 4 in. long, with spreading pedicels. Pod 1 to 3 lines long, acute at the top and at the base, tipped by a very short subulate style, pubescent with simple or stellate hairs, or nearly glabrous; valves very

convex, with a prominent midrib. Seeds oval-oblong, smooth, the mucus rather copious.

Queensland. Flats on the Maranoa, *Mitchell*.

N. S. Wales. Bathurst Plains and other parts of the interior of the colony, *A. Cunningham*, *Fraser*.

11. ***B. alpestris***, *F. Muell. in Trans. Phil. Soc. Vict.* i, 100. A dwarf herbaceous perennial, usually tufted, sometimes at first sight glabrous, but almost always more or less pubescent with stellate hairs visible under a lens. Flowering stems rarely 6 in. high. Leaves chiefly radical, petiolate, obovate-oblong, with a few coarse teeth, rarely almost lyrate-pinnatifid, or sometimes nearly entire, $\frac{3}{4}$ to 2 in. long; stem-leaves few and narrow. Flowers white or pink, often tinged with purple. Sepals nearly 1 line, petals about twice as long. Fruiting racemes rather dense, 1 to 2 in. long, with rigid spreading pedicels. Pod glabrous or nearly so, slightly curved, about 3 lines long and 1 line broad in the middle, tapering at the top and the base, the valves very convex and marked with a strong midrib. Seeds ovate, elegantly reticulate, exuding a rather thin coat of mucus when soaked.—*Capsella blennodina*, *F. Muell. Pl. Vict.* i, 42.

N. S. Wales. Ranges near Bathurst, *W. Wools*.

Victoria. Subalpine grassy meadows at the sources of the Murray and Snowy rivers, *F. Mueller*.

As observed by Dr. Mueller, this species certainly connects *Blennodia* with *Capsella*, but the habit and the broader septum in relation to the transverse diameter of the pod, appear to me to connect it much more with the former genus, where he had first placed it, than with the latter, to which he subsequently referred it.

9. STENOPETALUM, R. Br.

Sepals narrow, erect, equal at the base. Petals shortly lanceolate above the claw, tapering to a point, often long and twisted. Pod globular, ovoid, or shortly linear, the valves very convex, usually without any conspicuous nerve; septum membranous; stigma globular, sessile or rarely on a very short style. Seeds several, small, in 2 rows, not bordered, with free fili-form funicles; cotyledons incumbent.—Annuals, usually slender and glabrous, rarely tomentose and more rigid. Leaves linear. Flowers orange-yellow or white.

The genus is limited to Australia.

Pods erect, 2 to 4 times as long as broad.

Hoary tomentose. Pedicels as long as the pod. Petals 3 times as long as the calyx

1. *S. velutinum*.

Glabrous or slightly tomentose. Pedicels shorter than the pod.

Petals about twice as long as the calyx

2. *S. lineare*.

Glabrous. Flowers almost sessile. Petals more than twice as long as the calyx

3. *S. filifolium*.

Pods spreading or pendulous, globular or ovoid.

Sepals scarcely 1 line, petals not twice as long

4. *S. sphaerocarpum*.

Sepals $1\frac{1}{2}$ line or more, petals more than twice as long.

Pedicels slender, 2 or 3 times as long as the sepals.

Slightly hoary with appressed hairs. Leaves entire or remotely toothed

5. *S. nutans*.

Glabrous. Lower leaves mostly pinnatifid

7. *S. pedicellare*.

Pedicels shorter than the sepals

6. *S. robustum*.

1. **S. velutinum**, *F. Muell. Pl. Vict.* i. 49. Erect and rather rigid, 1 to $1\frac{1}{2}$ ft. high, white or hoary with a very short stellate tomentum, which disappears from the older leaves and the base of the stem. Leaves narrow-linear, rather thick, entire or with a few minute distant teeth, the lower ones $1\frac{1}{2}$ to 2 in. long, the upper ones much shorter. Flowers erect, on pedicels about as long as the calyx. Sepals about 2 lines long, tomentose. Petals yellowish, the long slender point fully 3 times as long as the calyx. Fruiting pedicels erect, 3 to 5 lines long. Pod elliptical-oblong or almost ovoid, about 3 lines long, very turgid, glabrous; valves nerveless; ovules 8 to 12 in each cell.

N. S. Wales. Tributaries of the Darling, *Bowman*; near Mr. Mawson's Robbleck station, *Leichhardt*.

Victoria. Barren localities on the Murray, rare, *F. Muell.*

S. Australia. Between Stokes range and Cooper's Creek, *Wheeler*.

2. **S. lineare**, *R. Br. in DC. Syst. Veg.* ii. 513. Usually erect, slender, little branched and quite glabrous, $\frac{3}{4}$ to $1\frac{1}{2}$ feet high. Leaves few, narrow-linear, 1 to $1\frac{1}{2}$ in. long, entire or occasionally pinnatifid, with 1 or 2 short linear lobes on each side. Flowers small. Sepals not $1\frac{1}{2}$ line long. Petals of a brownish-yellow, the narrow-linear exerted portion not longer than the sepals. Fruiting racemes slender but rigid, with erect pedicels not half so long as the pod. Pods erect, oblong, 2 to 3 lines long and scarcely 1 line broad, glabrous, the valves usually showing the midrib. Seeds 8 to 12 in each cell, small, ovate, smooth.—*Hook. Ic. Pl.* t. 618; *Hook. f. Fl. Tasni.* i. 22; *F. Muell. Pl. Vict.* i. 49.

N. S. Wales. Interior of the Colony, *A. Cunningham*; between Darling and Lachlan rivers, *Burkitt*.

Victoria. Sandy and rocky shores of Port Phillip and Wilson's Promontory, Murray desert and sandy localities near Mount M'IVOR, *F. Muell.*

Tasmania. South Esk river, thirty miles from Launceston, *Gunn*.

S. Australia. Near Adelaide, *F. Muell.*

W. Australia. *Drummond, n.* 680.

Var. *caulescens*. A low branching more robust form, the young shoots slightly hoary with a minute stellate pubescence, and the leaves rather thicker.—Port Phillip, *F. Muell.*

3. **S. filifolium**, *Benth.* A very slender, erect, glabrous annual, 1 to $1\frac{1}{2}$ ft. high, paniculately branched in the upper part. Leaves few, in our specimens filiform and entire, the longest $1\frac{1}{2}$ in. long. Racemes slender, erect, 3 to 6 in. long. Flowers very nearly sessile, small, and apparently yellow. Sepals scarcely $1\frac{1}{2}$ lines long. Petals when opened out nearly 5 lines, including the claw and long point. Pods oblong, $1\frac{1}{2}$ to nearly 3 lines long, $\frac{3}{4}$ to 1 line broad, the valves very convex and without any nerve, the pedicels seldom 1 line and often not $\frac{1}{2}$ line long. Ovules 6 to 8 in each cell.

W. Australia. *Drummond, 1st Coll.*

4. **S. sphærocarpum**, *F. Muell. in Trans. Phil. Soc. Vict.* i. 35, and *Pl. Vict.* i. 50. A slender glabrous annual, erect or branching and decumbent at the base, from a few inches to 1 ft. high. Leaves few, small, narrow-linear, entire or deeply divided into 3 to 5 narrow-linear lobes. Flowers very small, on recurved pedicels of nearly 1 line. Sepals not above 1 line long. Lamina of the petals scarcely longer. Fruiting racemes slender, one-

sided, with recurved pedicels of 2 to 3 lines. Pod nearly globular, $1\frac{1}{2}$ to 2 lines long, and often rather narrower; valves very convex, without any conspicuous nerve. Ovules 6 to 8 in each cell. Seeds few, exuding abundant mucus when soaked.

Victoria. Sterile, chiefly humid, sandy plains on the Murray, *F. Mueller*.

S. Australia. Near Lake Alexandrina, Barossa Range, Crystal Brook, and around Spencer's Gulf, *F. Mueller*.

S. Australia, *Drummond*.

5. **S. nutans**, *F. Muell. Fragm.* iii. 27. An erect annual, about 5 in. high in the single specimen seen, slightly hoary with appressed hairs. Leaves linear, entire or remotely toothed, about 1 in. long, narrowed at each end. Racemes loose. Pedicels much longer than the calyx, slender, erect when in flower, reflexed when in fruit. Sepals about $1\frac{1}{2}$ line long. Petals with a filiform point of 4 or 5 lines. Pod broadly oval-oblong, about $\frac{1}{2}$ lines long, very turgid, glabrous, ripening 3 or 4 seeds in each cell.

S. Australia. Between Stoke's Range and Cooper's Creek, *F. W. Loder* (a single specimen in *Herb. Mueller*).

6. **S. robustum**, *Endl. in Hueg. Enum.* 4. A glabrous, erect, and branching annual, in the original form stout, 1 to 2 ft. high, with rigid, spreading branches, in the more common variety slender, $\frac{1}{2}$ to $1\frac{1}{2}$ ft. high, with more erect branches. Leaves few, linear, entire or the lower ones pinnatifid, with 1 to 3 narrow lobes on each side. Racemes rigid or slender, somewhat one-sided, with spreading or recurved pedicels, not longer than the calyx when in flower, often rather longer than the pod when in fruit. Calyx $1\frac{1}{2}$ to near 2 lines long. Petals orange or white, the lamina more or less lanceolate at the base, tapering to a point often 3 lines long. Pods spreading or pendulous, rarely nearly erect, from nearly globular to shortly ovoid, $1\frac{1}{2}$ to 2 lines long, but rarely above $1\frac{1}{2}$ lines broad. Ovules 6 to 8 in each cell. Seeds few, with not near so much mucus as those of *S. sphaerocarpum*.—Hook. Ic. Pl. t. 620; *S. gracile*, Bunge, in Pl. Preiss. i. 257; *S. croceum* and *S. minus*, Bunge, l. c. 258.

W. Australia. Vasse river and Murchison river, *Oldfield*, the only specimens that quite agree with Endlicher's description; the more slender variety apparently much more common about Swan River, *Drummond*, n. 679. *Preiss*, n. 1936, 1938, 1939, and others.

7. **S. pedicellare**, *F. Muell. Herb.* Habit, stature, and foliage of the slender varieties of *S. robustum*, but still more slender. Racemes very loose, with filiform pedicels longer than the calyx from the first, and $\frac{1}{2}$ to $\frac{3}{4}$ in. long when in fruit. Calyx rather more than 1 line long. Petals apparently yellow, with a filiform point of 5 to 6 lines. Pod nearly of *S. robustum*, globular or ovoid, but I never find more than 4 ovules in each cell.

W. Australia. Murchison river, *Oldfield*.

10. **GEOCOCCUS**, J. Drumm.

Sepals short, spreading, equal at the base. Petals small. Pod oblong, slightly compressed, obtuse, the valves convex, with a prominent midrib; stigma sessile, entire. Seeds few, the two series rather distinct, oblong, not

bordered, with long funicles; cotyledons incumbent. — A stemless herb, with radical pinnately-divided leaves, ripening its pods underground.

The genus is limited to the following species.

1. **G. pusillus**, *J. Drum.* in *Hook. Kew Journ.* vii. 52. A stemless, tufted annual. Leaves all radical, spreading, $1\frac{1}{2}$ to 3 in. long, pinnately divided, with triangular or shortly lanceolate lobes, the lower ones distinct, the ultimate ones confluent. Flowers in our specimens imperfect, on short, erect, radical peduncles. Petals, according to Drummond, oblong, not clawed, shorter than the calyx. Fruiting peduncles lengthening to from $\frac{1}{2}$ to 1 in., recurved so as to bury the pod in the ground. Our pods are irregularly ripened.

W. Australia. Northern districts, on the limestone part of Conolly's Station, *Drummond*.

This curious little plant, unknown from any other locality, may possibly prove to be a condition of some species having usually dimorphous flowers, in which the more perfect ones are not developed. If so, it may very likely be a *Blennodia*, of some species of which it has the radical leaves.

11. MENKEA, Lehm.

Sepals spreading, equal at the base. Petals short, clawed. Pod broadly oval or linear-oblong, obtuse, very flat; the valves quite flat, 1-nerved, with reticulate veins; septum none or very narrow, bordering the replum; stigma sessile. Seeds numerous, very small, in two series, suspended from free capillary funicles along the replum; cotyledons incumbent.—Small annuals. Leaves few, linear, entire. Flowers small, white.

The genus is endemic in W. Australia.

Pods ovate, about 2 lines long, in loose slender racemes 1. *M. australis*.
Pods narrow-oblong, 4 to 5 lines long, in short dense racemes 2. *M. draboides*.

1. **M. australis**, *Lehm. in Ind. Seem. Hort. Hamb.* 1843, 8. A small, slender, glabrous annual, branching at the base, very much resembling *Capsella procumbens*. Radical leaves linear-oblong or lanceolate, entire or with 1 or 2 coarse teeth, about $\frac{1}{2}$ inch long including the petiole; stem-leaves small and few. Flowers white, very minute, the sepals about $\frac{1}{2}$ line long, the petals but little longer, with the lamina obovate or oblong. Fruiting racemes loose and slender, with filiform pedicels of 3 to 4 lines. Pods ovate, about 2 lines long.—Bunge, in *Pl. Preiss.* i. 259; *Stenopetalum procumbens*, *Hook. Ic. Pl.* t. 610; *Menkea procumbens*, *F. Muell. Fragm.* ii. 142; *Pl. Vict.* i. 222.

N. S. Wales. Darling river, *F. Mueller*.

Victoria. Murray desert, *F. Mueller*.

W. Australia, *Drummond, Coll.* 1843 n. 87 and 90; *Preiss, n.* 1937.

2. **M. draboides**, *Hook. f.* A smaller plant than *M. australis*, the stems seldom exceeding 2 in., but more robust and branching. Radical leaves about $\frac{1}{2}$ in. long, linear-oblong or lanceolate. Flowers small, with obovate-oblong petals, apparently yellowish. Fruiting racemes short and dense, with pedicels of 1 to 2 lines. Pod narrow-oblong, acute at the base, 4 to 5 lines long and 1 to $1\frac{1}{4}$ lines broad.—*Stenopetalum draboides*, *Hook. Ic. Pl.* t. 617; *Menkea australis*, *F. Muell. Fragm.* ii. 142, not *Lehm*.

W. Australia, *Drummond, Coll.* 1843.

12. **CAPSELLA.** Mærch.

(Microlepidium, F. Muell.)

Sepals spreading, equal at the base. Petals short. Pod ovoid or oblong, laterally compressed or nearly terete, the valves very turgid or boat-shaped, keeled, the septum thin; style short or stigma sessile. Seeds several, in 2 rows, not bordered, on free funicles; cotyledons incumbent or rarely accumbent.—Small or weak annuals. Radical leaves rosulate, entire or lobed. Racemes slender, with small white flowers.

A small genus dispersed over the temperate regions of both the northern and southern hemispheres. Two of the following species are exclusively Australian. The genus is nearly allied to *Blennodia*, but the pod is shorter and more compressed laterally, the septum being usually narrower than the transverse diameter.

Pod elliptical or ovoid, not much compressed, obtuse or acute at the top.

Plant glabrous. Pod many-seeded, the septum about 3 times as long as broad 1. *C. procumbens*.

Plant minutely pubescent. Pod few-seeded, the septum not twice as long as broad 2. *C. australis*.

Pod laterally compressed, cuneate or ovate, emarginate or broadly truncate at the top.

Plant much branched, of 1 to 2 in. Pod oval-oblong, emarginate, with rounded lobes and few seeds 3. *C. pilosula*.

Plant little branched, $\frac{1}{2}$ to $1\frac{1}{2}$ ft. Pod cuneate-triangular, with numerous seeds *C. Bursa-pastoris* (p. 82).

1. ***C. procumbens***, Fries, *Norrit. Fl. Suec. Mand.* i. 14. A small, slender, glabrous, decumbent, and much-branched annual, seldom exceeding 6 in., and often not 2 in. high. Leaves from lanceolate to nearly ovate, the lower ones petiolate, pinnatifid or toothed, rarely exceeding 1 in., the upper ones smaller, often linear and entire. Flowers white, very small, the petals scarcely exceeding the calyx. Fruiting racemes loose, with filiform spreading pedicels of 2 to 4 lines. Pod ovoid, $1\frac{1}{2}$ to 2 lines long, the valves very convex and boat-shaped, the septum 3 or 4 times as long as broad, and considerably narrower than the transverse diameter of the fruit. Seeds usually 10 to 12 or sometimes more in each cell.—Reichb. Ic. Fl. Germ. ii. t. 11; *Hutchinsia procumbens*, R. Br., DC. Syst. Veg. ii. 390; Hook. f. Fl. Tasm. i. 22; *Capsella elliptica*, C. A. Mey. Verz. Pfl. Cam. 194; F. Muell. Pl. Vict. i. 43; *Stenopetalum incisafolium*, Hook. f. in Hook. Ic. Pl. t. 276.

Victoria. Boggy, slightly saline places around Port Phillip Bay, and on the Murray, F. Mueller.

Tasmania. Blackman's River, on the road to Hobarton, Gunn.

S. Australia. Near St. Vincent's Gulf and Lake Alexandrina, F. Mueller; Gaichen Bay, H. Edwards.

W. Australia. Drummond, *Atk Coll.* n. 129.

A common plant in the northern hemisphere, especially around the Mediterranean and in Western and Central Asia, found also in N.W. America and in extratropical S. America.

2. ***C. australis***, Hook. f. A small annual, very near *C. procumbens*, and perhaps a variety only. It is usually still smaller, and sprinkled with a minute stellate pubescence. Foliage the same. Flowers rather larger. Pod

elliptical-ovate, about 2 lines long, and less compressed than in *C. procumbens*, the septum not twice as long as broad, and as broad at least as the transverse diameter of the fruit. Ovules usually 6 to 8 in each cell, of which only 3 or 4 come to maturity.—*Hutchinsia australis*, Hook. f. Fl. Tasm. i. 23, t. 4; *Capsella antipoda*, F. Muell. Pl. Vict. i. 44.

Victoria. Mount Macedon, summit of Mount Alexander, and in the Black Forest, F. Mueller.

Tasmania. Not unfrequent in dry stony places, but easily overlooked, J. D. Hooker. *Draba pumila*, R. Br. in DC. Syst. Veg. i. 353, from the minute specimens in the Banksian herbarium appears to be either *C. procumbens* or *C. australis*, in a very young dwarf state.

3. ***C. pilosula***, F. Muell. Pl. Vict. i. 44. A small erect annual, pubescent with short simple or stellate hairs, with numerous branches, often decumbent at the base, 1 to 3 in. high. Leaves small, obovate or lanceolate, entire, toothed or with a few lobes. Flowers small, white. Fruiting racemes rather rigid, with spreading pedicels shorter than the pod. Pods oval-oblong or cuneate, emarginate with short, rounded, but not winged lobes, laterally compressed, about 2 lines long, glabrous, the stigma sessile in the notch; septum narrow, very thin; valves boat-shaped and keeled, but not winged. Ovules 6 to 8 in each cell. Seeds few, without muc. when soaked.—*Microlepidium pilosulum*, F. Muell. in Linnæa, xxv. 371.

Victoria. Sandy desert, on the Murray, rare, F. Mueller. In the pod-valves hollow to the top in this species as in *C. Bursa-pastoris*.

C. Bursa-pastoris, Mönch; DC. Prod. i. 177; Reicheb. Ic. Fl. Germ. ii. t. 11, an erect annual, often above a foot high, the radical leaves usually spreading and pinnatifid, those of the stem few, narrow, clasping with projecting auricles, the pods triangular cuneate, much compressed in a long loose raceme; of European or Asiatic origin, but now one of the commonest weeds nearly all over the globe without the tropics, has also established itself in cultivated places in several of the Australian colonies.

13. **SENEBIERA**, Poir.

Sepals short, spreading, equal at the base. Petals short. Pod laterally compressed, orbicular or broader than long, either indehiscent or separating into two nuts, each with a single seed. Embryo bent in a circle, or the radicle incumbent on the back of the cotyledons, but with the bend above the attenuated base of the cotyledons, not at their junction with the radicle.—Annuals or biennials, much branched and usually prostrate. Leaves entire or pinnately divided. Flowers very small, in short leaf-opposed racemes.

There are several species dispersed over the warm as well as the temperate regions both of the New and the Old World, and more especially near the sea, the following ones extending to Australia.

Pods 1 line broad, slightly wrinkled, on slender pedicels.

Leaves linear, entire 1. *S. integrifolia*.

Leaves pinnate 2. *S. didyma*.

Pods 2 lines broad, deeply wrinkled, sessile or nearly so *S. Coronopus* (p. 83).

1. ***S. integrifolia***, DC. in Mém. Soc. Hist. Nat. Par. an 7, 144, t. 8, and Syst. Veg. ii. 522. A rigid, glabrous, somewhat glaucous annual (or biennial?), usually decumbent, and very much branched. Leaves linear, usually acute, $\frac{1}{2}$ to 1 in. long or rather more, narrowed into a petiole, quite entire or



very rarely with 1 or 2 small teeth. Flowers very small and numerous, in terminal or leaf-opposed racemes usually much longer than the leaves; pedicels slender, rarely exceeding 1 line. Pods like those of *S. didyma*, of the same size, and reticulate when young, becoming often warted or even corky when old.—*S. linoides*, DC.; Harv. and Sond. Fl. Cap. i. 27.

Queensland. Bird Island, Wreck reef, Denham.

The species has a wide range on the seacoasts of S. Africa and Madagascar, and we have it also from Pratas and other islands of the Chinese seas. *S. mexicana*, Hook. and Arn. Bot. Beech. 276, is the same plant, but was probably gathered in the islands of Ilo-Choo or Bonin, and not in Mexico.

2. *S. didyma*, Pers. Sya. ii. 185. A much-branched, prostrate annual, spreading on the ground from 6 in. to 1 ft. or more, glabrous, or with a few long loose hairs. Leaves pinnately divided into 7 to 11 narrow segments, which are usually again cut into 2 to 4 unequal linear or lanceolate lobes, the lower leaves often once pinnate, with oblong or obovate, entire or shortly lobed segments. Flowers very small and numerous, in leaf-opposed racemes, which seldom, even in fruit, exceed the leaves, the pedicels slender, 1 to 2 lines long. Pods about $\frac{3}{4}$ line long and 1 line broad, wrinkled, formed of 2 ovoid distinct lobes, which separate into 1-seeded nuts when ripe.—Reichb. Ic. Fl. Germ. ii. t. 9; *S. pinnatifida*, DC. Syst. Veg. ii. 523; Prod. i. 203.

A common weed in sandy soil, especially near the sea, in all warm countries, perhaps indigenous to S. Australia, and now established in the neighbourhood of towns in almost all the Colonies.

S. Coronopus, Poir., DC. Prod. i. 203, with rather coarser foliage, the flowers and fruits sessile or nearly so along the rachis of the raceme, and pods about 2 lines diameter, nearly orbicular, very much wrinkled and induriscant, a very common European weed, is mentioned by F. Mueller as introduced into Victoria, but I have not seen Australian specimens.

14. LEPIDIUM, Linn.

(Monoploca, Bunge.)

Sepals short, equal at the base. Petals short, equal, sometimes wanting. Pod ovate or shortly oblong, rarely orbicular, usually much compressed laterally and notched at the top, the valves boat-shaped, keeled or winged, the septum narrow; style filiform or stigma sessile. Seeds solitary in each cell, suspended from the top of the septum with a free funicle; cotyledons incumbent in all except one species not Australian. Herbs, undershrubs, or even small shrubs, very variable in habit. Leaves in the Australian species narrow or entire. Flowers small, white, the racemes without bracts.

A large genus, spread over the temperate and warmer regions of the globe, but not alpine and scarcely Arctic. Of the following species, one has a very wide geographical range, the others are confined to Australia, although one has nearly allied representatives in the Pacific islands. For the opportunity of inspecting original specimens of the *Lepidia* published by Desvaux, I am indebted to the kindness of M. La Vallée, of Paris, the present possessor of his herbarium.

Leaves all quite entire. Pod usually conspicuously winged.

Leaves broadly ovate or orbicular 1. *L. stronglylphyllum*.

Leaves linear or lanceolate.

Leaves linear-lanceolate. Sepals fully $2\frac{1}{2}$ lines long. Pod with 2 acute lobes 2. *L. linifolium*.

Leaves narrow-linear. Sepals 2 lines or less. Pod-lobes obtuse or very small.

- Petals linear. Sepals 2 lines. Stem shrubby 3. *L. leptopetalum*.
 Petals oblong or ovate. Sepals 1-1½ lines. Stem herbaceous.
 Lobes of the pod longer than the style (about 1 line).
 Valves winged to the base 4. *L. rotundum*.
 Lobes of the pod shorter than the style (not ½ line).
 Valves scarcely winged 5. *L. phlebopetalum*.
 Petals none. Stamens 4. Pod-wings almost united with the style 6. *L. monoplocoides*.
 Leaves mostly toothed or lobed. Flowers very small. Pod-wings small or none, except in *L. papillosum*.
 Petals none. Leaves narrow-linear, the upper ones auricled. Stems papillose. Stamens 4. Pod about 2 lines long, with 2 short lobes or wings 7. *L. papillosum*.
 Stems glabrous. Leaves linear or cuculate, not auricled, the radical ones pinnatifid. Stamens 2. Pod about 1½ lines, scarcely lobed 9. *L. ruderales*.
 Petals 4, minute. Leaves oblong-cuculate. Stamens 6. Pod 2½ to 3 lines long, with distinct lobes 8. *L. foliosum*.

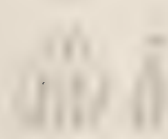
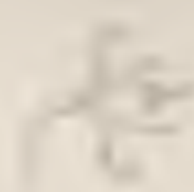
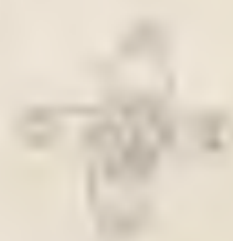
1. ***L. (?) stronglylphyllum***, *F. Muell. Herb.* Apparently shrubby, quite glabrous, with the branches denuded at the base. Leaves in the upper part of the branches, broadly ovate or nearly orbicular, or the upper ones elliptical-oblong, ½ to ¾ in. long, entire, rather thick, narrowed into a short petiole. Flowers unknown. Fruiting raceme evidently dense, with spreading pedicels of about 2 lines, the thick rhachis 1 to near 2 in. long. Pods only known by the persistent replum, which is oblong-lanceolate, nearly 3 lines long, ¾ line broad in the centre, terminating in a subulate style of about 1 line, and the scars of a funicle on each side at the upper angle of the replum show that there had been a single pendulous seed in each cell as in other *Lepidia*.

S. Australia. Mount Vision, on the clay-slate in the N.W. interior, *McDonald Stuart*. A very remarkable species, of which the small remains of a pod in one of the specimens (*Ib. F. Muell.*) have been barely sufficient to give a clue to the genus.

2. ***L. linifolium***, *Benth.* Glabrous and erect, 1 to 1½ ft. high or more. Leaves lanceolate or linear-lanceolate, acute, 1 to 2 inches long, entire, narrowed into a petiole. Flowers large for the genus, apparently pink or lilac. Sepals 2½ lines. Petals nearly twice as long, obovate. Fruiting racemes loose, with semi-erect or at length spreading pedicels of 4 to 5 lines. Pod without the wings nearly orbicular, rather more than 3 lines diameter, very flat, the wings at the top forming a triangular, erect, acute lobe nearly 2 lines long; the subulate style about half their length in the sinus, which is very open. Seeds compressed. Cotyledons linear.—*Lepia linifolia*, *Desv. Journ. Bot. iii. 166 and 181*; *Iberis linearifolia*, *DC. Syst. Veg. ii. 405*.

W. Australia. Sharks Bay, *Herb. Mus. Par.*; Flinders Bay, *Collie*; Murchison river, *Sanford*.

3. ***L. leptopetalum***, *F. Muell. Pl. Vict. i. 48*. A low, scrubby, much-branched shrub, quite glabrous. Leaves linear, thick and succulent, almost semiterete, the longer ones ½ to 1 in. long, those of the side branches much smaller. Sepals about 2 lines long. Petals scarcely longer, linear, often almost subulate. Stamens 6. Fruiting racemes short and loose, with spreading pedicels 2 to 3 lines long. Pod very flat, oval-elliptical, about 3



lines long; dorsal wings extending at least halfway down the valves, and forming at the top of the pod two short obtuse lobes, the subulate style projecting much beyond them. Seeds much compressed, exuding a viscous but clear mucilage when soaked.—*Monoploca leptopetala*, F. Muell. in Trans. Phil. Soc. Vict. i. 35.

N. S. Wales. Darling river, F. Mueller.

Victoria. High barren limestone rocks of the Murray, and in the surrounding district. F. Mueller.

4. **L. rotundum**, DC. Syst. Veg. ii. 537; Prod. i. 265. Glabrous and erect or branching and decumbent at the base, 3 to 6 in. or rarely nearly 1 ft. high. Leaves linear, obtuse or rarely acute, seldom above 1 in. long, quite entire, narrowed into a petiole. Flowers small, white. Sepals about 1 line. Petals obovate, rather longer. Fruiting racemes rigid, 2 to 4 in. long, with spreading pedicels of about two lines. Pod nearly orbicular, without the wings about two lines diameter, and not so flat as in *L. linifolium*; dorsal wings of the valves continued to their base, but much broader at the top, where they form two obtuse lobes at least 1 line long; style from $\frac{1}{2}$ to $\frac{3}{4}$ their length in the sinus, which is usually narrow.—Hook. Ic. Pl. t. 609; *Lepia rotunda*, Desv. Journ. Bot. iii. 166 and 181; *Monoploca rotunda*, Bunge, in Pl. Preiss. i. 260; *Monoploca linifolia*, Bunge, l. c., without the synonyms.

W. Australia. Swan River, Drummond, Preiss, n. 1941 and 2670; Princess Royal Harbour, Maxwell; Murchison river, Oldfield.

5. **L. phlebopetalum**, F. Muell. Pl. Vict. i. 47. Very closely allied to *L. rotundum*, and perhaps a variety only, scarcely differing from it except in the pod, which is orbicular-ovate, 2 to $2\frac{1}{2}$ lines long, with an exceedingly narrow wing extending about halfway down the back of the valves, and forming at the top two minute lobes, often not $\frac{1}{2}$ line and seldom $\frac{3}{4}$ line long; with the very slender small style projecting from between them. In some specimens, however, of Burkitt's the lobes of the pod and proportions of the style are intermediate between this and *L. rotundum*.—*Monoploca phlebopetala*, F. Muell. in Linnæa, xxv. 369.

N. S. Wales. Darling river, F. Mueller. Between the Lachlan and Darling river, Burkitt.

Victoria. Barren localities on the Murray, F. Mueller.

S. Australia. Rocky Creek, F. Mueller; N.W. interior, McDonald Stuart.

6. **L. monoplocoides**, F. Muell. in Trans. Phil. Soc. Vict. i. 35, and Pl. Vict. i. 47. An erect, branching annual, of about 6 in., glabrous or slightly rough with minute papillæ. Leaves narrow-linear, entire and not auricled, the lower ones sometimes 2 in. long, but mostly $\frac{1}{2}$ to 1 in. Flowers very minute, without petals and with only 4 stamens. Fruiting racemes 2 to 3 in. long, with rigid, rather spreading, flattened pedicels, of $1\frac{1}{2}$ to 2 lines. Pod orbicular, scarcely 2 lines long, flat, winged all round, the wings united with the style at the top, and projecting beyond it in 2 minute, connivent, acute lobes, forming a short point to the pod. Seeds with a viscid, clear mucus, as in several of the preceding species.

N. S. Wales. Darling river, F. Mueller.

Victoria. Mallee scrub, on the Murray, towards its junction with the Murrumbidgee. F. Mueller.

7. **L. papillosum**, *F. Muell. in Linnaea*, xxv. 370, and *Pl. Vict.* i. 16. An erect, branching annual, usually under 6 in., but, according to *F. Mueller*, sometimes 1 ft. high or more, the stems covered with little transparent papillæ, and exhaling an unpleasant scent. Radical leaves petiolate, often 2 in. long or more, linear-oblong, coarsely toothed or irregularly pinnatifid, the upper ones lanceolate or linear-cuneate, with a few remote teeth, and clasping the stem by their auricled base, $\frac{1}{2}$ to 1 in. long, and all glabrous. Flowers very small, without petals, and with only 4 stamens. Fruiting racemes mostly 2 to 4 in. long, with rigid, flattened, rather spreading pedicels, of about 2 lines. Pod obovate, about 2 lines long, the valves winged only above the middle, forming 2 rounded terminal lobes, a little more than $\frac{1}{2}$ line long, with the stigma sessile in the rather narrow sinus. Seeds exuding a viscid, clear mucilage in great abundance.

N. S. Wales. Interior of the colony, *A. Cunningham*. Between the Darling and Lachlan rivers, *Burkitt*.

Victoria. Murray desert, in several localities, *F. Mueller*.

S. Australia. In great numbers on the barren hills and plains near Crystal Brook, Rocky River, and to the N.W. of Spencer's Gulf, *F. Mueller*; between Stokes' Range and Cooper's Creek, *Wheeler*.

8. **L. foliosum**, *Desv. Journ. Bot.* iii. 164 and 180; *DC. Prod.* i. 206. A low, straggling, glabrous herb, apparently perennial, with hard irregularly divaricate branches, sometimes attaining 2 feet, but often very much smaller. Leaves mostly oblong-cuneate, $\frac{1}{2}$ to 1 in. long, but sometimes lanceolate or almost linear and nearly 2 in. long, or short and obovate, usually with a few coarse teeth at the top, sometimes toothed from the base or pinnatifid with short entire or even toothed lobes, usually narrowed below the middle, but always with a broad half-stem-clasping base, and sometimes auricled. Flowers very small. Petals on short slender claws, with a minute white ovate lamina. Fruiting racemes 2 to 3 in. long, often becoming lateral by the elongation of leafy shoots, with spreading pedicels of about 2 lines. Pods ovate or elliptical, flat, $2\frac{1}{2}$ to 3 lines long, sometimes almost wingless, but usually the very narrow wings form 2 minute, obtuse, terminal points, between which is the very short style. Seeds exuding a not very thick mucilaginous coat.—*L. cuneifolium*, *DC. Syst. Veg.* ii. 515; *Hook. f. Fl. Tasm.* i. 25; *L. impressum* *Bunge*, in *Pl. Preiss.* i. 260.

N. S. Wales. Lord Howe's Island, near the coast, and in waste places, *Mitue, McGillivray*.

Victoria. On the seacoast, *Harvey*.

Tasmania. On the seacoast, in various places round the island, and in the islands of Bass's Straits, *J. D. Hooker*.

S. Australia. Kangaroo Island, *Bernier. (Hb. Muell.)*

W. Australia. Fremantle, *Collie, Preiss, n. 1942*.

This species is chiefly distinguished from *L. ruderale* by its coarser habit, usually broader leaves and more perfect flowers, and by the pods usually twice the size. It represents in Australia the *L. piscidium* of the Pacific Islands, which has a nearly similar pod and flowers, but most of its leaves are narrowed into a petiole, without the broad stem-clasping base of the Australian plant.

9. **L. ruderale**, *Lim.*; *DC. Prod.* i. 205. An annual, biennial, or sometimes perennial, glabrous or with a few minute scattered hairs, commencing to flower when very small, but growing out to 1 or even 2 ft., with

hard stems, and numerous divaricate, thin, wiry branches. Radical leaves once or twice pinnatifid, with narrow-linear lobes, but soon decaying; stem-leaves linear or rarely almost oblong-cuneate, usually with a few irregular teeth, especially towards the top, sometimes almost pinnatifid, the uppermost often linear and entire. Flowers minute, without petals, and with only 2 stamens. Fruiting racemes usually rather loose, but rigid, 2 to 3 in. long, with slender stiff spreading pedicels of 2 or 3 lines, but sometimes the racemes remain short and dense as when in flower. Pods ovate, 1 to near $1\frac{1}{2}$ lines long, minutely 2-lobed at the top, with a short style between the lobes. Seeds ovate, usually exuding no mucus.—Reichb. Ic. Fl. Germ. ii. t. 10; Hook. f. Fl. Tasm. i. 25; F. Muell. Pl. Vict. i. 45; *L. puleratum*, Bunge, Pl. Preiss. i. 261; *L. hyssopifolium*, Desv. Journ. Bot. iii. 164 and 179; *L. fruticulosum*, Desv. l. c. 165 and 180 (a tall luxuriant form).

N. S. Wales. New England, *C. Stuart*; Paramatta, *Herb. Mueller*.

Victoria. Throughout the colony, except at alpine elevations, *F. Mueller*.

Tasmania. Common on waysides and by the seashore in many localities, *J. D. Hooker*.

S. Australia. Abundant in many localities, especially about salt-marshes and in waste places, *F. Mueller* and others.

W. Australia. Apparently abundant, *Drummond*, *Preiss*, a. 1940, and others.

Var. *crispum*. Usually striated and very divaricate. Leaves short, oblong, cuneate, mostly toothed. Pods rather long.—*S. crispum*, Desv. Journ. Bot. iii. 165 and 176; *L. Novæ-Hollandiæ*, Desv. l. c. 177.

Var. (?) *spinescens*. Smaller branches becoming thorny; pods rather larger, ovate or elliptical, the notch scarcely perceptible.—Salt-marshes of S. Australia towards the mouth of the Murray, *Hildebrand*, *Whan*, in *Herb. Mueller*. *L. ambiguum*, F. Muell. in Trans. Phil. Soc. Vict. i. 34, appears to be the same or a similar variety in a luxuriant state without the thorns. Both are now included by F. Mueller in the *L. rudérale*.

The species has a wide range, chiefly along the seacoasts of the temperate regions of Europe, Asia, and N. Africa.

15. THLASPI, Linn.

Sepals erect, equal at the base. Petals obovate, equal. Pod short, ovate, obovate, obcuneate or oblong, much compressed laterally, notched or rarely acute at the top, the valves boat-shaped, keeled or winged, the septum narrow; style filiform or stigma sessile. Seeds 2 or rarely 3 or 4 in each cell, not winged; cotyledons accumbent.—Annual or perennial herbs, the radical leaves usually spreading, entire or toothed, those of the stem often auricled at the base. Flowers white, pink, or pale purple, rarely yellow.

A considerable genus spread over the temperate and colder regions of the northern hemisphere, with a very few S. American species, and none from S. Africa. The Australian ones are all endemic, and differ from the generality of the northern ones in the seeds, usually 3 or 4 in each cell instead of 2 only; three of the species have not the auricled leaves of the genus, and one has yellow flowers.

Slender plant of 1 to 3 in. Stem-leaves auricled and stem-clasping . 1. *T. Tasmanicum*.

Stems rigid, with petiolate leaves.

Pubescence scanty, mostly simple.

Flowers white 2. *T. cochlearium*.

Flowers yellow 3. *T. ochroleucum*.

Pubescence stellate 4. *T. Drummondii*.

1. **T (?) Tasmanicum**, *Hook. f. Fl. Tasm.* i. 23. A small, slender,

erect, simple, or slightly-branched annual, 1 to 3 in. high, sprinkled with a few stellate hairs. Radical leaves petiolate, ovate, entire, 2 to 3 lines long; stem-leaves lanceolate or oblong, often 5 to 6 lines long, the lowest narrowed at the base, the others auricled and stem-clasping. Flowers small, white, the petals longer than the sepals. Fruiting racemes loose, with slender divaricate pedicels of 2 to 3 lines. Young pod obovate, very flat, with strongly keeled valves and 3 or 4 seeds in each cell.—*Hutchinsia Tasmanica*, Hook. Ic. Pl. t. 848.

Tasmania. Western mountains at Arthur's Lake, *Gunn*.

The habit of this little plant is quite that of the European species of *Thlaspi*, in which genus Dr. Hooker had at first placed it. We have since thought it might belong to the New Zealand genus *Notothlaspi*, characterized by numerous seeds and incumbent cotyledons, a point which cannot be determined till more mature seeds shall have been examined. The habit is against the association.

2. ***T. cochlearinum***, *F. Muell. Pl. Fict.* i. 51. An erect, rigid, branching annual, 6 in. to 1 ft. high, slightly pubescent, with a few short, mostly simple and reflexed hairs. Leaves lanceolate or linear-oblong, entire or with 1 or 2 coarse teeth or lobes on each side, narrowed into a petiole, the lower leaves about 2 in. long, the upper ones few and smaller. Flowers white, rather large. Sepals open, $1\frac{1}{4}$ in. long. Petals much larger. Fruiting racemes loose, about 2 in. long, with half-spreading pedicels of 6 to 8 lines. Pod broadly oval, 4 to 5 lines long, obtuse at the top but not notched, pubescent with short, rigid, reflexed hairs; styles subulate, nearly 1 line long. Valves keeled, but not distinctly winged. Seeds 2 to 4 in each cell, flat, orbicular, emitting a clear, viscid mucus when soaked; cotyledons accumbent.—*Eunomia cochlearina*, *F. Muell. in Linnæa*, xxv. 369.

S. Australia. Sandy hills between the Broughton and Rocky rivers, and at Crystal Brook, *F. Mueller*.

3. ***T. ochranthum***, *F. Muell. mss.* From the very few specimens this appears to be a smaller plant than *T. cochlearinum*, which it approaches very nearly, with the same appressed hairs, either reflexed or attached by the centre, and a similar though smaller foliage, but the flowers are yellow, the fruiting pedicels much shorter, and the pods very broadly oval or almost orbicular, about 3 lines long.

N. S. Wales. On the tributaries of the Upper Darling, *Bourman*. Between the Darling and Lachlan rivers, *Berkitt*, in each case single small specimens (*Hb. F. Muell.*)

3. ***T. Drummondii***, *Benth.* Stems more branching than in *T. cochlearinum*, loosely sprinkled with short stellate hairs. Upper leaves apparently linear-lanceolate, coarsely toothed and on long petioles, but the few on the specimens are in a very bad state. Fruiting racemes 2 to 4 in. long, with spreading pedicels mostly of about 2 lines. Pods obovate-oblong, 4 lines long and 2 broad, obtuse or almost notched, with a very short style, acute at the base, sprinkled with stellate hairs; the valves acutely keeled but scarcely winged. Seeds 2 to 4 in each cell, ovate, compressed, emitting a clear viscid mucus when soaked; cotyledons accumbent.

W. Australia. *Drummond, Coll.* 1845. The specimens are very imperfect.



ORDER IX. CAPPARIDÆ.

Flowers usually hermaphrodite. Sepals 4 to 8, either in a single series, free or united in a campanulate calyx, or 2 outer and 2 inner ones. Petals usually 4, imbricate, rarely 2 or none. Torus either small or expanded into a disk or lengthened into a straight or curved stalk to the ovary. Stamens inserted at the base or the summit of the torus or stalk of the ovary, definite or indefinite, all perfect or some reduced to staminodia. Ovary 1-celled, with 1 or usually several parietal placentas, which sometimes protrude so as to divide the ovary into imperfect cells. Stigma sessile or borne on a distinct style. Ovules usually numerous, rarely solitary, anatropous. Fruit either a capsule, with the valves separating from the persistent septum or placentas as in *Cruciferae*, or indehiscent and succulent, or rarely dry. Seeds reniform or angular, without or with only a very thin albumen. Embryo curved, the cotyledons incumbent, folded, or convolute, very rarely flat. Herbs or shrubs, rarely trees. Leaves alternate or very rarely opposite, simple, or consisting of 1 to 5 digitate leaflets, with or without stipules, which when present are occasionally prickly. Flowers either solitary or clustered in the axils of the leaves, or more frequently in terminal racemes.

The Order is pretty generally distributed over the warmer and tropical regions of both the New and the Old World. Of the following genera, two only, of one species each, and both anomalous in the Order, are peculiar to Australia, the other three are widely spread tropical genera.

Herbs with a capsular fruit.

Torus short, the stamens inserted immediately within the sepals and petals. Seeds several.

Stamens 4 to 6, or rarely 8. 1. *CLEOME*.

Stamens 8 to 16 2. *POLANISIA*.

Torus elongated, bearing the stamens at the top under the ovary.

Stamens all perfect, with long filaments. Leaves alternate, with digitate leaflets. Sepals 4. Seeds several 3. *GYNANDROPSIS*.

Stamens very short, those on one side only bearing anthers.

Leaves opposite, undivided. Calyx 5-lobed. Capsule 1-seeded. 4. *EMBLINGIA*.

Shrubs or trees, with an indehiscent succulent fruit.

Ovules and seeds many.

Torus elongated, with a tube-like appendage at the base 5. *CADABA*.

Torus short without any basal appendage 6. *CAPPARIS*.

Ovules and seeds usually solitary.

Leaves minute or none. Flowers dioecious. Sepals imbricate.

Torus small. Filaments long 7. *APOPHYLLUM*.

Leaves opposite. Flowers hermaphrodite. Calyx 5-lobed. Torus

elongated, with a lobed disk at the top, with anthers on one side 4. *EMBLINGIA*.

1. *CLEOME*, Linn.

Sepals 4, sometimes united in a 4-toothed calyx. Petals 4, nearly equal. Stamens 6, rarely 4 or 8, all or some only perfect, inserted on the short torus immediately within the petals. Ovary sessile or stalked, with many ovules, the stigma sessile or on a short subulate style. Capsule usually elongated, sessile or stipitate. Seeds many, reniform, usually rough or woolly.—Herbs, either glabrous or glandular-pubescent. Leaves with 3 to 7 digitate leaflets,

or in some species not Australian simple. Flowers solitary or in terminal racemes.

A large genus chiefly abundant in the warm parts of America, and in the hot sandy districts of N.E. Africa and S.W. Asia.

Stemless, with radical leaves and 1-flowered scapes 1. *C. oxalidea*.
Erect and leafy, with racemose flowers 2. *C. tetrandra*.

1. ***C. oxalidea***, *F. Muell. Fragm.* i. 69. A little, glabrous, glaucous, almost stemless annual. Leaves radical, consisting of 3 obovate or orbicular leaflets, 2 to 4 lines long, on a slender petiole longer than themselves. Scapes filiform, 1-flowered, $1\frac{1}{2}$ to 2 in. long. Sepals about 1 line long. Petals of a pale pink, ovate, about 2 lines long. Stamens 6 to 8, with linear-oblong anthers attached near the base. Capsule sessile, linear-oblong or narrow-linear, $\frac{1}{2}$ to 1 in. long.

N. Australia. Gravelly plains on the Upper Victoria river, and table land at the head of Sturt's Creek, *F. Mueller*.

2. ***C. tetrandra***, *Banks, in DC. Prod.* i. 210. An annual, either glabrous or sprinkled with a few short glandular hairs, the stems often several together, slender, ascending from a few inches to $1\frac{1}{2}$ ft. Leaves chiefly at the base of the stems on long petioles, with 3 or 5 linear-lanceolate or narrow-oblong leaflets sometimes above an inch long, the upper leaves few, small, with only 3 leaflets or simple. Raceme loose and slender, with filiform pedicels. Sepals $\frac{1}{2}$ to 1 line long. Petals narrow, 3 to 6 lines long, nearly equal. Stamens 4 to 6. Capsule sessile, slender, 1 to $1\frac{1}{2}$ in. long, with a short subulate style, the valves thin and minutely striate. Seeds transversely wrinkled.

N. Australia. N.W. coast, *Bynoe*; Victoria river, *F. Mueller*; Port Essington, *Armstrong*; Gulf of Carpentaria, *R. Brown*.

2. **POLANISIA**, Rafin.

Sepals and petals 4 each, as in *Cleome*. Stamens usually 8 or more, inserted on the short torus. Ovary and capsule sessile or stalked, with many ovules and seeds, as in *Cleome*.—Herbs, with the habit of *Cleome*, from which the genus only differs in the increased number of stamens. Flowers in terminal racemes.

The genus is distributed over the warmer and tropical regions of both the New and the Old World. The only Australian species is a common tropical weed.

1. ***P. viscosa***, *DC. Prod.* i. 242. An erect branching annual or biennial, usually about 1 ft. high, more or less covered with short, glandular, viscid hairs. Leaflets 3 or 5, very rarely 7, from obovate or oblong-cuneate to linear-lanceolate, the largest usually 1 to $1\frac{1}{2}$ in. long, but mostly much smaller. Flowers yellow, in terminal racemes. Sepals about 2 lines, petals twice or thrice as long, from narrow-oblong to almost ovate. Stamens from 8 to 16. Capsule from oblong-linear about 1 in. long to narrow-linear and 3 in. long, strongly striate, the nerves very oblique and anastomosing in the short pods, nearly parallel in the long ones, and always glandular-pubescent. Seeds wrinkled.—*Cleome flava*, *Banks, in DC. Prod.* i. 241.



Umbagogia calceatiformis

N. Australia. Along the whole coast from westward of Victoria river to the limits of Queensland, and abundant about the Gulf of Carpentaria, *R. Brown*, and others.

Queensland. Moreton Bay, *F. Mueller*.

N. S. Wales. Clarence river, *Beckler*.

Var. *gracillima*. Slightly pubescent. Leaflets narrow. Sepals about 4 lines, petals nearly 1 in. long. Capsule above 4 in. long. N.W. coast, *Brown*; Swains Island, *Hornem*.

Some specimens from the gravelly bed of the Victoria river, *F. Mueller*, have shed out from the flowering racemes, numerous branches crowded with small leaves, and very small axillary flowers almost without stamens, but producing small, slender capsules, the whole plant assuming the appearance of the *P. microtha*, *Rej.*, from Madagascar. Other specimens from the same locality have all the leaves entire or 3-lobed, but these have no flowers to determine the species with certainty.

The species is a common weed throughout India, extending into tropical Africa.

3. GYNANDROPSIS, DC.

(*Ræperia*, *F. Muell.*)

Sepals and petals 4 each, as in *Cleome*. Torus produced into a long slender gynophore, bearing at its summit about 6 stamens with filiform filaments. Ovary sessile or stalked within the stamens, with many ovules, the stigma sessile or on a subulate style, and the capsule sessile or stalked and many-seeded, as in *Cleome*. Herbs, with the habit of *Cleome*, from which the genus only differs in the long stalk-like torus bearing the stamens. Flowers in terminal racemes.

Gynandropsis, like the last two genera, is dispersed over the tropical regions, both of the New and the Old World. The only Australian species is endemic, and remarkable for the very large size of its flowers.

1. **G. Muelleri**, *Reichb.* An erect annual, covered with a glandular viscid pubescence. Leaflets 3 or 5, lanceolate or oblong-linear, those of the upper leaves $\frac{1}{2}$ to 1 in. long on a long petiole. Flowers yellow, on short pedicels in the upper axils, forming a terminal leafy raceme. Sepals $\frac{1}{2}$ to near 1 in. long, narrow, acuminate, unequal. Petals fully 3 in. long, oblong, narrowed into a long claw. Stamens 5 to 7, the stipes or elongated torus often $1\frac{1}{2}$ in. long. Capsule linear, 2 to $2\frac{1}{2}$ in. long, not striate, but rough with short glandular hairs, terminated by a slender style of nearly 1 in.—*Ræperia cleomoides*, *F. Muell.* in Hook. Kew Journ. ix. 15.

N. Australia. N.W. coast, *Byron*. High, rocky, sandy table-land at the sources of the river Victoria, Hooker's Creek, and Sturt's Creek, *F. Mueller*.

4. EMBLINGIA, *F. Muell.*

Calyx campanulate, 5-lobed, and split to the base on the upper side. Petals 2, united into a slipper-shaped corolla, ascending on the side opposite to the slit of the calyx. Torus produced into a linear, flat, curved stalk, ascending in the slit of the calyx, bearing a glabrous gland at the base inside. Stamens forming a spreading, disk-shaped ring at the summit of the torus, divided into 8 to 10 lobes, 4 to 6 of the outer lobes or staminodia oblong, pubescent, and without anthers, 4 or 5 on the inner side, very short, each bearing an ovoid 2-celled anther. Ovary sessile within the stamens, ovoid, shortly 2-winged at the top, with a divaricately 2-lobed stigma sessile between

the wings. Placentas 2, each bearing a single laterally-attached ovule. After flowering, the ovary turns down into the calyx, enlarges very obliquely, the 2 wings forming 2 small points on one side near the base. Fruit dry, indehiscent, with a thin pericarp. Seed solitary, reniform, with a hard, rough, almost muricate testa. Embryo involute, as in most *Capparidæe*.—Shrub or undershrub, with opposite leaves and axillary flowers.

This curious genus consists of only a single species peculiar to Australia.

1. **E. calceoliflora**, *E. Muell. Fragm.* ii. 3, t. 11. A prostrate shrub or undershrub, harshly pubescent, resembling in habit some species of *Scaevola*, and assuming a yellowish hue when dry. Leaves mostly opposite or nearly so, lanceolate or elliptical, acute, mostly 1 to $1\frac{1}{2}$ in. long, narrowed into a short petiole, wavy on the edges, and very harsh. Stipulary spines very minute, often wanting. Flowers on very short axillary pedicels. Calyx about 3 lines long, rather herbaceous, divided to about the middle into 5 broad lobes. Corolla about twice as long, broadly oblong, pubescent. Torus about 4 lines long, pubescent on the thin edges, nearly glabrous along the thickened centre. Pericarp glabrous, 3 or 4 lines broad.

W. Australia. Marchison river, *Oldfield*. The specimens are too far advanced in flower for satisfactory examination.

5. CADABA, Forst.

Sepals 4, free, the 2 outer ones valvate in the bud. Petals 4, 2, or none, clawed. Torus elongated, bearing at the base on one side a tubular, erect appendage. Stamens 4 to 8, inserted on the summit of the torus. Ovary on a long stalk within the stamens, 1-celled; placentas 2 or 4, with many ovules in 2 rows. Stigma small, sessile. Berry cylindrical. Seeds nearly globular; cotyledons convolute.—Shrubs, unarmed or prickly. Leaves simple, or in species not Australian 3-foliolate or wanting. Flowers axillary, or in terminal racemes or corymbs.

The genus extends over Africa and tropical Asia; the only Australian species is also in the Indian Archipelago.

1. **C. capparoides**, *DC. Prod.* i. 244. A tall shrub, the young branches, foliage, and inflorescence shortly pubescent. Stipulary spines small, recurved, occasionally wanting. Leaves simple, petiolate, from ovate to oblong-lanceolate, obtuse or the upper ones acute, 2 to $3\frac{1}{2}$ in. long, membranous, pinninerved, green and pubescent on both sides. Flowers in short, loose, terminal racemes. Pedicels above 1 in. long, in the axils of small bracts. Outer sepals herbaceous, concave, nearly $\frac{1}{2}$ in. long; inner ones smaller. Petals 4, turned towards the side of the flower opposed to the stamens and pistil, 3 with slender claws longer than the calyx, and ovate laminae of unequal size, but not exceeding 4 lines, the fourth with a shorter, broader claw, and small lamina. Stalk-like torus longer than the calyx, with a much shorter tubular process at the base. Stamens 5 or 6, with slender filaments. Fruit pubescent, slender, 4 or 5 in. long, on a long stalk. Seeds numerous. — *Deless. Ic. Sel.* iii. 5, t. 9 (incorrect as to the sepals and petals, but accurately described in the text).

N. Australia. N. coast, *Herb. Mus. Par.*; Vansittart Bay, *A. Cunningham*. It is also found in Timor and Java.



6. CAPPARIS, Linn.

(Busbeckia, Endl.)

Sepals usually 4, rarely 5, free or the outer ones united in the bud into an entire calyx, which splits irregularly as the flower expands. Petals usually 4, imbricate. Stamens indefinite, inserted on the short torus, the filaments free, filiform. Ovary borne on a long stalk, 1 to 4-celled, with 2 to 6 placentas and several or many ovules; stigma sessile. Berry stalked, globose or elongated, very rarely deliscent. Seeds several, immersed in pulp, with a hard or coriaceous testa and convolute embryo.—Trees or shrubs, sometimes climbing, unarmed or prickly. Leaves simple, membranous or coriaceous; stipules prickly or setaceous, often only on the young or barren shoots.

A large genus, distributed over the tropical and warm regions both of the New and the Old World, and divisible, chiefly from remarkable differences in the calyx, into several sections, of which two only are Australian, one, *Eucapparis*, comprises the greater number of the Asiatic and African species, but is not American, the other, *Busbeckia*, is confined to Australia and Norfolk Island. The Australian species of both sections are all evergreen, and many of them are remarkable for producing slender barren shoots, with very prickly stipules, and small leaves so very differently shaped from those of the flowering branches, that where we have specimens of these barren branches only, it is impossible to identify them.

SECT. I. **Eucapparis.** Sepals 4, rather large, imbricate in 2 series. Berry globular or ovoid.

Flowers on slender pedicels in terminal umbels. Outer sepals equal. 1. *C. umbellata*.
Flowers lateral or axillary, pedicels solitary or one above the other.

One of the outer sepals larger and saccate or concave at the base.

Stamens 12 or under. Flowers small.

Pedicels usually 2, one over the other. Flowers very tomentose. 2. *C. lasiantha*.

Pedicels 4 or 5, one above the other. Flowers slightly pubescent 3. *C. quiniflora*.

Stamens numerous, or more than 15.

Sepals very unequal, the largest $\frac{3}{4}$ in. 4. *C. nummularia*.

Sepals slightly unequal, about 3 lines 5. *C. sarmentosa*.

SECT. II. **Busbeckia.**—Two outer sepals broad, very concave, completely united in the bud, and separating irregularly as the flower expands.

Leaves mostly ovate or oblong.

Leaves mostly 2 to 4 in. long. Ovary glabrous. Fruit from $\frac{1}{2}$ to a little more than 1 in. diameter.

Flowers mostly axillary, distant.

Leaves ovate. Buds ovoid, acuminate, 1 in. long, almost woody

6. *C. gracilis*.

Leaves ovate or oblong. Buds globular, $\frac{1}{2}$ in. long, coriaceous

7. *C. nobilis*.

Leaves ovate. Buds 4-angled

8. *C. canescens*.

Flowers in a terminal corymb or short raceme. Buds globular

9. *C. lucida*.

Leaves mostly 1 to $1\frac{1}{2}$ in. long. Ovary tomentose. Fruit 2 in. diameter

10. *C. Mitchellii*.

Leaves lanceolate or long and narrow.

Leaves obtuse at the base. Petiole very short

11. *C. loranthifolia*.

Leaves narrowed into a rather long petiole

12. *C. umbonata*.

SECTION I. EUCAPPARIS, DC. *Prod.* i. 245. Sepals 4, rather large, imbricate in two series. Berry globular or ovoid.

1. ***C. umbellata***, R. Br. in DC. *Prod.* i. 247. Shrubby, with the young branches tomentose. Stipulary spines small, nearly straight or recurved. Leaves from ovate to narrow-oblong, mostly $1\frac{1}{2}$ to 2 in., or when

full grown 3 in. long, at first membranous, softly pubescent or tomentose, at length stiff and usually glabrous, on petioles of about two lines. Pedicels slender, 6 to 9 lines long, usually 6 to 8 together in terminal umbels, sessile above the last leaves, or sometimes on short, lateral, leafless branches. Buds small, globular. Outer sepals thin but stiff, equal, 2 to 2½ lines long, orbicular, concave, slightly imbricate, glabrous, inner ones scarcely longer, much imbricate. Petals about 3 lines long, pubescent. Stamens numerous. Ovary glabrous, with 8 to 10 ovules to each placenta. Berry globular, smooth, in our specimens not 1 in. diameter, on a stipes of 1 in. Seeds separated by spurious partitions.

N. Australia. Carcaring Bay, N.W. coast, *A. Cunningham*; barren plains of the Fitzmaurice and Victoria rivers, *F. Mueller*; Gulf of Carpentaria, *R. Brown*; Port Essington, *Armstrong*.

Queensland. Cape York, *M'Gillivray*; Port Denison, *Fitzalan*.

The species is most nearly allied to the common Indian *C. sepiaria*, differing chiefly in its sessile umbels and less numerous flowers.

2. ***C. lasiantha***, *R. Br. in DC. Prod.* i. 247. A much-branched shrub, clothed with a soft tomentum, usually rust-coloured on the young branches and inflorescence, afterwards paler, and sometimes disappearing on the old leaves. Leaves from ovate to narrow-oblong or almost lanceolate, obtuse, 1 to 2 in. long, rounded at the base, with a very short petiole, thickly coriaceous when full grown, with very oblique primary nerves. Pedicels axillary, solitary or 2 together one above the other, much shorter than the leaves. Outer sepals very concave and unequal, slightly imbricate, softly tomentose, the larger one about 3 lines long and almost saccate at the base; inner sepals and petals ovate, 4 to 5 lines long, very tomentose outside. Stamens about 12. Ovary glabrous, with 10 to 12 ovules to each placenta. Young fruit ovoid, on a slender stipes of 1½ in.

N. Australia. N.W. coast, *A. Cunningham*; Victoria river, *F. Mueller*; Thomson river, *A. C. Gregory*.

Queensland. N.E. coast, *R. Brown*; Narran river, *Mitchell*; Brisbane river, *A. Cunningham* (from a specimen without flowers).

N. S. Wales. Tributaries of the Upper Darling river, *Bowman*.

3. ***C. quiniflora***, *DC. Prod.* i. 247. Branches weak and flexuose, the young ones and very young leaves rusty-tomentose, but soon becoming glabrous. Leaves ovate, obtuse or acuminate, 3 to 4 in. long, rounded or almost cordate at the base, on petioles of 3 to 4 lines, rather coriaceous. Pedicels usually under ½ in. long, 3 to 5 together, one above the other, in lateral clusters along the leafless tops of the side-branches, or above the upper axils. Outer sepals thin, slightly pubescent, unequal, the larger one saccate at the base and about 3 lines long; inner sepals and petals longer, oval-oblong, pubescent. Stamens few. Fruit glabrous, globular, ½ to 1 in. diameter, on a stipes of about 1 in. Some barren shoots, with very small ovate, rhomboid, or oblong leaves, assume a totally different aspect from the rest of the plant.

N. Australia. N. coast, *Baudin*.

Queensland. N.E. coast, *R. Brown*, *A. Cunningham*; Cape York, *M'Gillivray*; Hammond Island, Torres Straits, *Rayner*. Also in New Caledonia.

4. ***C. nummularia***, *DC. Prod.* i. 246. A low glabrous shrub, prostrate

or reclining on rocks, with hard tortuous branches. Stipular spines short, straight or recurved. Leaves broadly ovate or orbicular, very obtuse or sometimes emarginate, with a minute point in the notch, $\frac{1}{2}$ to $\frac{3}{4}$ in. long, rather thick, on petioles of 3 to 4 lines. Peduncles axillary, solitary, 1 in. long or more. Outer sepals glabrous, very unequal, imbricate, the large one broadly hood-shaped, acuminate, $\frac{3}{4}$ in. long, the other much narrower and concave. Inner sepals and petals apparently longer and glabrous, but very imperfect in our specimens. Stamens very numerous. Berry ovoid, succulent, fully $1\frac{1}{2}$ in. long, marked with longitudinal ribs, on a stipes of at least $1\frac{1}{2}$ in.—F. Muell. *Fragm.* i. 143 and 244.

N. Australia. Nichol Bay, *Herb. Mueller.*

W. Australia. Sterile islands, *Herb. Mus. Par.*: Dirk Hartog's Island, *A. Cunninghamham, Clifton*; Abrolhos Island, *Bygonæ*; Murchison river, *Oldfield, Clifton, Milne.*

5. **C. sarmentosa**, *A. Cunn. Herb.* A slender tree, supporting itself on the branches of others, the younger branches slightly rusty-tomentose. Stipular spines very short and hooked. Leaves almost sessile, broadly ovate, obovate, or orbicular, obtuse, $\frac{1}{2}$ to $\frac{3}{4}$ in. long or sometimes much smaller, thin and glabrous when full grown. Flowers 1 or 2 together in the upper axils, on pedicels of 4 to 6 lines. Outer sepals glabrous, slightly unequal, about 3 lines long; inner sepals and petals rather longer, slightly tomentose or pubescent. Stamens 15 or more. Berry ovoid, not large, on a slender stipes of about an inch.

Queensland. Brisbane river, *A. Cunninghamham, F. Mueller*; between the Macleod and Archer's rivers, *Leichhardt.*

SECTION II. BUSBECKIA.—Two outer sepals broad, very concave, completely united in the bud and separating irregularly as the flower expands. Two inner sepals more petal-like. Berry globular or ovoid.

6. **C. ornans**, *F. Muell. Herb.* A woody climber, the branches hoary with a minute pubescence. Leaves ovate, obtuse, 2 to 3 in. long, narrowed at the base, on petioles of $\frac{1}{2}$ to 1 in., glabrous on both sides. Stipular spines conical, reflexed, often wanting on the flowering branches. Pedicels solitary in the upper axils, $1\frac{1}{2}$ to 2 in. long. Flowers large and showy. Outer sepals united into an ovoid acuminate bud of above 1 in. long, of a woody texture, and bursting irregularly; inner sepals orbicular, woolly inside, thick but petal-like. Petals (4?) obovate, more than 2 in. long. Stamens numerous, about 3 in. long. Ovary glabrous. Fruit not seen.

Queensland. Port Denison, *Fitzalan.*

7. **C. nobilis**, *F. Muell. Herb.* A small tree, either perfectly glabrous or the young shoots and the under side of the leaves slightly covered with a close minute pubescence. Stipular prickles short and conical, seldom seen on the flowering-branches. Leaves oval-oblong or oblong, acute, shortly acuminate or obtuse, 2 to 4 in. long, coriaceous and often shining above, on petioles of 3 to 6 lines. Pedicels solitary in the upper axils or very rarely 2 together, about 1 in. long. Buds globular, about $\frac{1}{2}$ in. diameter, often slightly emarginate at the top, showing the tips of the 2 outer sepals, which are perfectly united into a coriaceous calyx bursting or splitting irregularly;

inner sepals broadly ovate, $\frac{1}{2}$ in. long, firm in the centre, thin on the edges. Petals 4, white, larger and thinner than the sepals, pubescent inside. Stamens very numerous. Fruit globular, about 1 in. diameter, with a small protuberance at the top, the stipes $\frac{1}{2}$ in. to nearly 2 in. long. Seeds numerous, embedded in a hard almost woody pulp.—*Busbeckia nobilis*, Endl. Prod. Fl. Norf. 64; *Busbeckia arborea*, F. Muell. Fragm. i. 163.

Queensland. Brisbane river, *Fraser, A. Cunningham*; Brisbane and Fitzroy rivers, *F. Mueller*.

N. S. Wales. Hastings and Clarence rivers, *Beckler* and others.

Var. *pubescens*, petioles shorter, leaves more pubescent underneath, fruit scarcely umbonate. Brisbane river, *A. Cunningham*.

The same species is also found in Norfolk Island.

8. **C. canescens**, *Banks in DC. Prod. i. 246*. Habit and foliage so nearly that of *C. nobilis* that some specimens without the buds are difficult to distinguish from it, but in general they are of a paler more glaucous green, either minutely pubescent or glabrous. Stipular prickles subulate, wanting on the flowering branches. Leaves as in *C. nobilis*, or more frequently broader and more obtuse, mostly $1\frac{1}{2}$ to 2 in. long, those of the barren shoots sometimes broadly ovate-cordate with a prickly point. Pedicels solitary or 2 together in the upper axils or terminal, 1 to 2 in. long. Buds tomentose, larger than in *C. nobilis*, and prominently 4-angled. Flowers, of which I have only seen fragments, apparently like those of *C. nobilis*. Fruit (not yet ripe) as in *C. nobilis*, but on a longer stipes.

Queensland. Bay of Inlets, *Banks*; Northumberland islands and Keppel Bay, *R. Brown*; Burdekin and Lynd rivers, *F. Mueller*.

Var. *glauca*. Leaves 3 to 4 in. long, very thick and glaucous. Between the Flinders and Lynd rivers, *F. Mueller*.

9. **C. lucida**, *R. Br. Herb.* A shrub, very nearly allied to *C. nobilis*, but more often pubescent. Leaves ovate or oblong, obtuse, 2 to 3 or rarely 4 in. long, coriaceous and shining when old, but often thinner than in *C. nobilis* and more reticulate. Flowers white, rather smaller than in *C. nobilis*, and usually several together in a terminal cluster or short raceme, the outer ones in the axils of the uppermost leaves. Buds globular, on pedicels of about 1 in. Fruit globular, like that of *C. nobilis*.—*Phylacium lucidum*, DC. Prod. i. 254; *Busbeckia corymbiflora*, F. Muell. Fragm. i. 163.

N. Australia. N.W. coast, *A. Cunningham*; Booby islands, Torres Straits, *Herb. Banks*.

Queensland. N.E. coast, *R. Brown, A. Cunningham*; islands of Howitt's group and on the Burdekin river, *F. Mueller*; Howitt's isles, Hope islets, and Port Moller, *M. Gollivray*; Port Denison, *Fitzalan*.

10. **C. Mitchelli**, *Lindl. in Mitch. Three Exped. i. 315*. A much-branched shrub, more or less clothed with a minute yellowish or whitish tomentum, sometimes soft and dense, sometimes disappearing on the older leaves. Stipular prickles short, somewhat hooked, often wanting on the flowering branches. Leaves ovate or oblong, obtuse, 1 to $1\frac{1}{2}$ in. long, narrowed into a petiole of 2 to 3 lines, coriaceous and rather thick, obscurely veined. Pedicels few, axillary, 1 to $1\frac{1}{2}$ in. long, thickened upwards. Buds ovoid-globular, usually acuminate, nearly $\frac{1}{2}$ in. long. Outer calyx thick, opening





Ludwig Beckner del. & lith.

Botanical Illustration

Busbeckea Mitchellii.

irregularly or sometimes into 2 valvate concave sepals. Inner sepals 4 to 8 lines long, more or less pubescent, especially at the base, thin and glabrous on the edges. Petals similar, but larger. Ovary tomentose, on a long nearly glabrous stipes. Berry globular, 2 in. diameter when ripe. Seeds 4 to 5 lines long, imbedded in a hard dry pulp.—*Busbeckia Mitchellii*, F. Muell. Pl. Vict. i. 53, t. suppl. 4.

N. Australia. Plains of Promise, F. Mueller.

Queensland. In the interior, Mitchell; Burdekin river, F. Mueller.

N. S. Wales. Liverpool plains, A. Cunningham; plains of the Bogan, Mitchell; Upper Darling river, F. Mueller.

Victoria. Mallee scrub, near Eustone Cole, F. Mueller.

S. Australia. From Lake Torrens and Mount Murchison to Cooper's Creek, F. Mueller.

11. **C. loranthifolia**, Lindl. in Mitch. Trop. Austr. 220. A scrubby bush, with more or less tomentose branches. Leaves from oblong-linear to broadly lanceolate, obtuse or acute, $1\frac{1}{2}$ to $2\frac{1}{2}$ in. long, obtuse at the base, on a petiole of 1 or rarely 2 lines, coriaceous and at length glabrous. Pedicels in the upper axils about 1 in. long, thickened upwards. Buds ovoid, scarcely acuminate, the outer calyx not so thick as in the other species of the section *Busbeckia*. Inner sepals larger, thickened in the centre. Petals longer thinner, villous inside. Stamens numerous. Ovary glabrous.

Queensland. Scrub, near Mount Faraday, Mitchell.

N. S. Wales. Between Darling river and Cooper's Creek, Neilson.

12. **C. umbonata**, Lindl. in Mitch. Trop. Austr. 257. A shrub, with tomentose branches like the last, but the leaves usually much longer, often 7 to 8 in. long, and rarely under 3 in., always lanceolate and narrowed into a rather long petiole. Pedicels axillary, thickened upwards. 1 to $1\frac{1}{2}$ in. long. Buds ovoid, the outer calyx very thick and coriaceous. Petals as in *C. Mitchellii*. Fruit apparently small, glabrous, not always marked with the terminal protuberance which suggested the specific name; the stipes very long.

N. Australia. Victoria river and dry ridges towards Fitzmaurice river, F. Mueller; Depuch Island, Bynoe.

Queensland. Brigalow scrub, on the Belyando, Mitchell; Dawson river, Herb. F. Mueller.

7. APOPHYLLUM, F. Muell.

Flowers dioecious. Sepals 3 or 4, imbricate, 2 outside the others. Petals 2 or 4, sessile, imbricate. Male fl.: Stamens 8 to 16, inserted on the short torus with filiform filaments. Ovary none. Female fl.: Stamens none, or rarely 1 to 3. Ovary stipitate with a sessile stigma; ovules 1 or 2, attached to the sides of the cavity above the middle. Berry shortly stipitate. Seeds 1 or 2, with a smooth testa and involute cotyledons. Leaves very few, small, alternate.

The genus is limited to the following species, and differs from *Capparis* only in its dioecious flowers and the usually solitary ovule.

1. **A. anomalum**, F. Muell. in Hook. Kew Journ. ix. 307. A shrub or tree, almost leafless, with cylindrical, often pendulous branches, silky-white when young, but soon becoming glabrous. Leaves on the young shoots few,

linear or linear-acute, 2 to 3 lines long and very deciduous, or rarely above $\frac{1}{2}$ in. long and more persistent. Flowers small, fragrant, either growing singly along the young shoots or in short lateral racemes or clusters. Petals 1 to $1\frac{1}{2}$ lines long. Sepals rather more than 1 line long, pubescent. Petals unequal, as long as or longer than the sepals, pubescent inside at the base. Fruit nearly globular, the size of a small pea.

N. Australia. Brigalow scrub, on the Burdekin, *F. Mueller*; Cooper's river, *A. C. Gregory*.

Queensland. In the interior, *Mitchell*.

ORDER X. VIOLARIÆ.

Flowers usually hermaphrodite. Sepals 5, imbricate. Petals 5, imbricate, equal or unequal, with the lower one larger, or spurred or otherwise dissimilar. Stamens 5, hypogynous or nearly so, the anthers erect and connivent, or connate round the pistil, sessile or on short filaments, the connective often very broad, with the anther-ells opening inwards. Ovary free, sessile, 1-celled, with usually 3 parietal placentas, and several or rarely only 1 or 2 anatropous ovules to each placenta. Style usually simple, often thickened or curved at the top. Fruit a capsule, opening in as many valves as placentas, or rarely an indehiscent berry. Seeds with a fleshy albumen; embryo axile, usually straight, the cotyledons usually broad and flat, the radicle at the hilum.—Herbs or shrubs. Leaves usually alternate, simple, and rarely lobed or cut, with lateral stipules. Flowers axillary, solitary, or in cymes or panicles, very rarely in racemes. Pedicels usually with 2 bracteoles. Capsules often opening elastically.

An Order generally dispersed over the globe. Of the three Australian genera, two have a very wide geographical range, the third extends from Australia to New Zealand.

Herbs or undershrubs, with very irregular flowers. Fruit capsular.

Sepals produced into a small appendage, or at least a protuberance below their insertion. Lower petal spurred or saccate . . . 1. *VIOLA*.

Sepals not produced at the base. Lower petal saccate or gibbous at the base . . . 2. *IONIDIUM*.

Shrubs with small regular flowers. Fruit a berry . . . 3. *HYMENANTHERA*.

(The widely-spread tropical genus *Aisodeia* has not yet been detected in Australia.)

1. *VIOLA*, Linn.

Sepals produced into a small appendage or protuberance below the insertion. Petals spreading, the lowest usually larger, spurred or saccate at the base. Anthers nearly sessile, the connectives flat, produced into a membranous appendage beyond the cells, those of the 2 lower anthers usually bearing a small dorsal reflexed protuberance or spur. Style variously thickened or dilated at the top, straight with a terminal stigma, or incurved with the stigma in front. Capsule opening elastically in 3 valves. Seeds ovoid-globular with a crustaceous testa.—Herbs, with the stipules usually foliaceous and persistent. Peduncles axillary, 1-flowered. Most species, besides the perfect flowers, produce later in the season small apetalous, but very prolific flowers.



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A very large number of the species natives of the temperate regions of the northern hemisphere, or of the high mountains of South America, and a very few dispersed over Africa, Australia, and New Zealand. The Australian species are either quite and entirely extend only to Norfolk Island and New Zealand. They are all perennials.

Stemless, with a tufted or creeping rhizome.

Leaves lanceolate, oblong, or scarcely ovate. No stolons. Stipules adnate. 1. *V. betonicæfolia*.

Leaves nearly orbicular.

Stolons creeping. Spur reduced to a slight protuberance. Stipules free 2. *V. hederacea*.

No stolons. Spur prominent. Stipules adnate 3. *V. Cunninghamii*.

Flowering-stems elongated. Leaves broad.

Leaves scarcely cordate. Stipules adnate 3. *V. Cunninghamii*.

Leaves deeply cordate. Stipules free 4. *V. Caleyana*.

1. ***V. betonicæfolia*, Sm.; DC. Prod. i. 294.** Glabrous or pubescent, stemless, and without stolons, and often tufted, the stock either ending underground abruptly, with thick spreading fibres, or tapering into a horizontal or descending root. Leaves reniform, from lanceolate to oblong or nearly ovate, mostly obtuse, and 1 to 1½ in. long, entire or slightly erose, trinate or slightly cordate, rarely narrowed at the base, with the long petiole usually dilated at the top. Stipules linear, adnate to the petiole. Scapes of the perfect flowers usually considerably longer than the leaves, with the subulate bracts below the middle. Flowers violet, rather large. Sepals lanceolate, acute, 2½ to nearly 3 lines long, with short blunt bearded appendage. Lateral petals usually copiously bearded inside, the upper ones less so, the lowest not at all; spur broad and obtuse, much shorter than the sepals. Style thickened upwards, concave at the top, not winged. Apetalous flowers on very short scapes.—Hook. f. Fl. Tern. i. 27; F. Muell. Pl. Vict. i. 64; *V. polytaenæfolia* and *V. longiscapa*, DC. in Herb. Lamb., from the char. in G. Don, Gen. Syst. i. 322.

Queensland. Mitchell; near Brisbane, F. Mueller.

N. S. Wales. Port Jackson, R. Brown, *Subl. n.* 180, and others; northward to Clarence and Macleay rivers, *Beckler*; southward to Twofold Bay, F. Mueller, and in the interior to the Lachlan river, A. Cunningham, Fraser, etc.

Victoria. Port Phillip, R. Brown; grassy moist ridges, sparingly scattered over the southern and eastern parts of the colony, F. Mueller.

Tasmania. Common in moist good soils throughout the island, J. D. Hooker.

S. Australia. Near Rivoli Bay and in the Bight ranges, but rare, F. Mueller.

Received also from Norfolk Island, *Buckhouse*, and the species is nearly close to *V. Patriciana*, DC., which is common in India, eastern Siberia, and China, and only appears to differ from *V. betonicæfolia* in the rather longer spur and the style usually broadly winged.

2. ***V. hederacea*, Labill. Pl. Nov. Holl. i. 66, t. 91.** Glabrous or pubescent, densely tufted or widely creeping by its numerous stolons, very rarely emitting weak leafy stems. Leaves reniform, orbicular, or spatulate, usually under ½ in. diameter, but when very luxuriant, 1 to 1½ in., entire or irregularly and sometimes coarsely toothed. Stipules free, brown, lanceolate-subulate. Scapes usually longer than the leaves, the bracts about the middle. Flowers usually small, blue, rarely white, but sometimes fully ¾ in. broad. Sepals lanceolate, with only a slight protuberance below their insertion. Petals glabrous, or the lateral ones slightly pubescent inside, the spur of the lower

one reduced to a slight concavity. Lower anthers with a very slight dorsal protuberance. Style bent at the base, the upper part cylindrical, truncate at the top, but not thickened. Seeds usually dark-coloured, but sometimes white. —DC. Prod. i. 305; Hook. Exot. Fl. iii. t. 225; Reichb. Icon. Exot. t. 110; Hook. f. Fl. Tasm. i. 26; F. Muell. Pl. Vict. i. 65; *V. Sieberiana*, Spreng. Syst. Cur. Post. 96; *Eriopon reniforme*, Sweet, Brit. Fl. Gard. ii. t. 170; *V. hederacea*, *V. petiolare*, and *V. spathulatum*, G. Don, Gen. Syst. i. 335.

Queensland. Moreton Bay, *Fitzalan*.

N. S. Wales. Frequent about Port Jackson, *R. Brown*, *Sieber*, n. 426, and others; northward to Clarence river, *Beckler*; and southward to Twofold Bay, *F. Mueller*.

Victoria. Dispersed over the whole colony, except the N.W., in sandy moist heathy soil, along rivulets and in boggy places up to 7000 ft. elevation, *F. Mueller*.

Tasmania. Throughout the island, very common, *J. D. Hooker*.

S. Australia. Rare, near Mount Barker, on the Onkaparinga, in the Barossa ranges, and near Rivoli Bay, *F. Mueller*.

3. **V. Cunninghamii**, *Hook. f. Fl. N. Zel.* i. 16. Glabrous, stemless, or rarely with weak elongated stems, the stock tufted with an underground creeping rhizome. Stipules adnate to the petiole, with a short free lanceolate-subulate point. Leaves very broadly ovate or nearly orbicular, truncate or slightly and broadly cordate at the base, mostly under $\frac{1}{2}$ in. diameter, slightly crenate. Peduncles of the perfect flowers longer than the leaves, the small bracts below the middle. Flowers rather small, pale violet. Sepals oblong-lanceolate. Lateral petals obscurely bearded; spur short and obtuse, yet much more prominent than in *V. hederacea*. Spurs of the lower anthers short and obtuse. Style club-shaped, emarginate at the top.—*Hook. f. Fl. Tasm.* ii. 357.

Tasmania. In the Western Mountains, by rivulets on Cuning's Head, *Archer*. Also in New Zealand.

4. **V. Caleyana**, *G. Don, Gen. Syst.* i. 329. Usually glabrous. Stems weak, decumbent or half erect, from a few inches to nearly a foot long. Leaves ovate or nearly orbicular, very deeply cordate, from $\frac{1}{4}$ to $1\frac{1}{2}$ in. long, or when very luxuriant, larger and broadly triangular, often obscurely crenate. Stipules oblong or lanceolate, leafy, free from the petiole. Peduncles of the perfect flowers usually longer than the leaves, with the bracts about the middle. Flowers rather small, white. Sepals lanceolate. Petals glabrous or the lateral ones slightly bearded, the spur very short and broad. Anther-spurs very short. Style almost as in *V. biflora*, thickened upwards, concave at the top, truncate or emarginate at the back, and open in front.—*Hook. f. Fl. Tasm.* ii. 357; *F. Muell. Pl. Vict.* i. 64.

N. S. Wales. Nepean river, *R. Brown*; near Marshall's Mount, Illawarra, *Backhouse*.

Victoria. Banks of rivulets subject to inundation, near springs, and in wet forest gullies, Gipps' Land, *F. Mueller*.

Tasmania. Deloraine, *Archer*.

Peculiar to Australia, but very nearly allied to the European and Asiatic *V. biflora*, Linn. (*V. reniformis*, Wall.), which has more reniform leaves and yellow flowers.



2. **IONIDIUM**, Vent.

(Pigea, DC.)

Sepals not produced at the base. Petals spreading, the lowest sometimes slightly larger than the others, more frequently very much larger, with a broad claw, gibbous or saccate at the base. Anthers nearly sessile, or on distinct filaments, the connectives flat, produced into a membranous appendage beyond the cells, those of the 2 lower ones bearing a dorsal reflexed protuberance, spur, or gland, the 2 rarely united into one. Style thickened and incurved at the top, with the stigma in front. Capsule opening elastically in 3 valves. Seeds ovoid-globular, with a crustaceous testa. Herbs or small shrubs. Leaves alternate or rarely opposite, usually narrow. Stipules small and narrow. Peduncles axillary or in a terminal raceme, 1- or several-flowered.

A considerable genus, chiefly tropical, and the greater number of species American; four or five are found in tropical Asia and Africa, and one of these occurs in Australia, the others here enumerated are all endemic.

Peduncles axillary, 1-flowered, or very rarely here and there 2-flowered.

Lower petal more than twice as long as the calyx.

Leaves entire, or rarely toothed. Appendages of the lower filaments nearly glabrous. Seeds striate 1. *I. suffruticosum*.

Leaves toothed. Appendages of the lower filaments woolly-hairy. Seeds smooth 2. *I. aurantiacum*.

Lower petal not half as long again as the calyx 3. *I. brevilabre*.

Peduncles 1-flowered in the upper axils, the upper ones longer than the leaves, and forming a terminal leafy raceme 5. *I. Vernoni*.

Peduncles mostly 2- to 4-flowered, not longer than the leaves. Lower petal small 4. *I. floribundum*.

Peduncles slender, much longer than the leaves, with a leafless raceme of 2 or more flowers.

Upper leaves often opposite. Sepals lanceolate, shorter than the lateral petals 6. *I. filiforme*.

Leaves all alternate. Sepals ovate, as long as or longer than the lateral petals 7. *I. calycinum*.

1. ***I. suffruticosum***, *Ging. in DC. Prod.* i. 311. Much-branched, glabrous or very slightly pubescent, and usually from 1 to 1½ ft. high, and more or less woody at the base. Leaves alternate, narrow-linear, or rarely linear-oblong or lanceolate, entire or rarely toothed, mostly 1 to 2 in. long. Peduncles axillary, filiform, 1-flowered, 2 to 4 lines long, with a pair of minute bracts under the pedicel. Sepals lanceolate, very acute, with a very prominent green midrib, 1½ to 2 lines long. Lateral petals rather longer than the calyx, with a broad ovate-falcate base, and a small, ciliate, obtuse extremity, sometimes expanded into a small lamina; upper petals smaller; lowest petal purple or rarely yellow, about ½ in. long, the claw longer than the other petals, saccate at the base, the lamina broadly ovate and longer than the claw. Filaments at least half as long as the anthers, the 2 lower ones with a thick spur, either quite glabrous or with a minute tuft of hair. Seeds elegantly marked with longitudinal striae. Wight, *l.c.* t. 308; *Pigea Banksiana*, DC. *Prod.* i. 307.

N. Australia. Gulf of Carpentaria, *R. Brown*; Dampier's Archipelago, *A. Cunningham*; Port Essington, *Armstrong*; Arnhem's Land to lat. 32° on the E. coast, *F. Mueller*.

Queensland. Brisbane river, etc., Moreton Bay, *F. Mueller*, *Fitzalan*; Rockhampton, *Thozet*; Port Denison, *Fitzalan*.

N. S. Wales. Clarence and Hastings rivers, *Beckler*.

The species is widely spread over tropical Asia and Africa. The above description is taken from Australian specimens; in the majority of Indian and African ones, the leaves are broader and the lower petal smaller. The flowers are almost always purple, but some specimens of Cunningham's and Brown's, said to have yellow flowers, have the seeds and foliage of *I. suffruticosum*, rather than of *I. aurantiacum*.

2. ***I. aurantiacum*, F. Muell. Herb.** Pubescent with short spreading hairs or rarely glabrous, often woody at the base, branched, 6 in. to 1 ft. high or rather more. Leaves linear or oblong-lanceolate, 1 to 1½ in. long, bordered with small, distant, acute teeth. Flowers axillary, on peduncles of 3 to 4 lines, as in *I. suffruticosum*, and nearly similar in structure, but the lower petal is smaller and always yellow, the broad lamina usually shorter than the long narrow claw, which is scarcely saccate at the base, and the appendages of the filaments of the lower stamens are covered with long woolly hairs. Seeds, in the few capsules I have seen, smooth and not striate.

N. Australia. N.W. coast, *A. Cunningham*, *Bynoe*; Victoria river, *F. Mueller*.

The distinction between this species and *I. suffruticosum* may require revision when more abundant specimens in flower and seed are obtained, and the relation of the differences of the seeds to the other characters more correctly ascertained.

3. ***I. brevilabre*, Benth.** A glabrous perennial with a woody rhizome. Stems erect, divaricately branched, 6 in. to 1 ft. high, with few small leaves, or in some specimens numerous, nearly simple, about 6 in. high, with more crowded and longer leaves, sometimes 1 in. long, always linear and entire, obtuse, or with a recurved point. Peduncles axillary, slender, 1- or rarely 2-flowered, shorter than the leaves, with a pair of small narrow bracts under the short recurved pedicels. Flowers small (blue?). Sepals narrow-ovate, acute, rather more than 1 line long. Lateral petals about the same length, very obtuse; lowest petal rather longer, the lamina broadly rhomboid, much shorter than the claw, which is broad, concave, with a short obtuse spur at the base. Stamens with the terminal appendage longer than the cells, and the 2 lower filaments distinctly spurred.

W. Australia. Swan River, *Drummond*, 1st Coll., and n. 665 of a subsequent one.

It is possible that further specimens may prove this to be a remarkable variety of *I. floribundum*.

4. ***I. floribundum*, Walp. Rep. ii. 767.** A glabrous perennial, with the habit of some European species of *Thesium*, forming sometimes a thick woody rhizome, the stems erect, often much branched and rigid. Leaves all alternate, rather crowded, linear or lanceolate-linear, mostly with a short recurved point, ½ to 1 in. or rarely 1½ in. long, entire. Peduncles axillary, usually once or twice forked, each branch bearing 1 or 2 small violet, blue, or white flowers, on pedicels of about a line, the whole forming little cymes rarely exceeding the leaves, the lower peduncles sometimes 1-flowered, but always with several pairs of small bracts. Sepals ovate, 1 to nearly 2 lines long. Lateral petals about the same length, very obtuse; lowest petal not twice as long, the lamina broad, the short claw distinctly spurred. Two

lower stamens shortly spurred at the base.—F. Muell. Pl. Vict. i. 68, t. suppl. 8; *Pigea floribunda*, Lindl. in Mitch. Three Exped. ii. 165; *I. australasia*, Behr. in Linnaea, xx. 629; *I. multiflora*, Turcz. in Bull. Mosc. 1854, ii. 340.

N. S. Wales. Eurylean scrub, *A. Cunningham*.

Victoria. Barren ridges and low stony and rocky ranges in the vicinity of the Murray river and its lower tributaries, *F. Mueller*; towards the Australian Pyrenees, *Mitchell*.

S. Australia. Not rare through the scrubby lowlands and mountain tracts from Guichen Bay to Spencer's Gulf, *F. Mueller*, and others.

W. Australia. South coast?, *Drommond*, supplement to 5th Coll. n. 72, *Harvey*.

5. **I. Vernonii**, *F. Muell. Pl. Vict. i. 223. Glabrous, with erect, slender, but stiff stems, little branched, except at the base, and usually about 1 ft. high, as in *I. filiforme*, but the branches more angular. Leaves all alternate, linear or narrow-lanceolate, rarely above 1 in. long, and the upper ones much smaller and very narrow. Peduncles 1-flowered, as in *I. suffruticosum*, but only in the upper axils, and the upper ones longer than the small floral leaves, so as to form a terminal leafy raceme. Flowers blue, very much like those of *I. filiforme*, the lower petal of the same shape and size, except that the claw is distinctly spurred at the base, and the lateral petals are more obtuse than in that species; stamens the same, except that the subulate appendages at the top of the anther-cells are still more minute.*

N. S. Wales. Port Jackson, *Anderson*, *R. Vernon*, *Woolfs*. In the interior?, *Leichhardt*; Twofold Bay, *F. Mueller*.

Victoria. Barren plains and ridges near the Genoa river, *F. Mueller*. Specimens of this species are included by De Candoille amongst those named by him *Pigea filiformis*; the two species are often mixed on the same sheet in the Paris and other Herbaria.

6. **I. filiforme**, *F. Muell. Pl. Vict. i. 66*. A perfectly glabrous herb, said by some collectors to be annual, but certainly in many instances forming a perennial root-stock. Stems slender, but stiff and wiry, simple or branched, usually 1 to 2 ft. high, but when eaten down, sending up numerous short erect branches. Leaves alternate or the upper ones opposite, narrow-linear, mostly 1 to 2 in. long, entire, the lowest ones shorter, broader, and petiolate. Flowers blue, in slender leafless racemes, on terminal or axillary peduncles, always much longer than the leaves, the pedicels under a line long. Sepals shorter than the lateral petals, lanceolate, acute. Lower petal usually fully $\frac{1}{2}$ in. long, ovate, narrowed into a concave claw, saccate at the base, but varying considerably in size and breadth; lateral petals broadly falcate, acute, about 2 lines long; upper ones smaller. Anthers with an orange ovate appendage at the top of the connective, and two minute subulate appendages on the cells themselves; the 2 lowest have also a small glandular protuberance on the back at their base. — *Pigea filiformis*, DC. Prod. i. 307; *I. linarioides*, Presl, Bot. Bm. 12.

Queensland. Moreton Bay, *A. Cunningham*, *Fraser*; Glasshouse ridges, *F. Mueller*.

N. S. Wales. Common about Port Jackson, *R. Brown* and others, and northward to New England, ascending to 5000 ft., and Clarence and Hastings rivers, *Beckler*, and southward to the limits of the colony.

Victoria. Dry, grassy, or scrubby ridges near the Avon and Mitchell rivers in Gipps' Land, *F. Mueller*.

I. monopetalum, Rom. and Schult. Syst. i. 400 (*Pigea monopetala*, Ging. in DC. Prod. i. 307; *Solen monopetala*, Spreng. Syst. i. 891), described from a single specimen of uncertain origin, in Reomer's Herbarium, can only refer to the present species.

7. **I. calycinum**, *Steud.*; *F. Muell. Pl. Vict.* i. 224. A glabrous perennial, with the habit, narrow-linear leaves and racemose flowers on long leafless peduncles, of *I. filiforme*, but the leaves are usually all alternate, the sepals larger, ovate, with a short point, very thin and scarious on the edges, usually fully 2 and often 3 lines long. Lower petal fully as large as in *I. filiforme*, and of the same shape, except that the spur at the base is more prominent; the lateral petals scarcely exceed the calyx and are very obtuse, the upper ones rather shorter. The protuberances at the base of the lower anthers are more prominent than in *I. filiforme*, broad and very obtuse, and the subulate tips to the cells are very minute or wholly wanting.—*Pigea calycina*, DC. *Prod.* i. 307; *Solea calycina*, Spreng. *Syst.* i. 804; *Pigea glauca*, Endl. in *Hueg. Enum.* 5; *Ionidium glaucum*, *Steud.*; *F. Muell. Pl. Vict.* i. 67; *Flamingia australasica*, *Vriese*, in *Pl. Preiss.* i. 399, as corrected, ii. 242.

W. Australia. Swan River, *Huegel*, *Drummond*, *Preiss*, n. 1449 and others; Murchison river, *Oldfield*.

3. HYMENANTHERA, R. Br.

Sepals nearly equal. Petals nearly equal, short. Anthers almost sessile, united in a tube round the pistil, the connectives all terminating in a membrane, and bearing on their backs an erect scale. Placentas of the ovary 2 or rarely 3, each bearing 1 ovule. Style short, with a 2- or rarely 3-lobed stigma. Berry globular, small. Seeds 1 or 2, nearly globular. Cotyledons narrow.—Rigid shrubs or small trees. Leaves alternate, often clustered, small, entire or toothed, without stipules. Flowers small, axillary, frequently polygamous.

A small genus which, besides the following species, comprises one from Norfolk Island, and another from New Zealand.

1. **H. dentata**, *R. Br. in DC. Prod.* i. 315. A glabrous, rigid, much branched shrub, often attaining many feet in height, but low and scrubby in alpine situations, the side branches often converted into strong thorns. Leaves from oblong-elliptical to linear, obtuse or acute, usually $\frac{1}{2}$ to $1\frac{1}{2}$ in. long, and marked with a few irregular distant teeth, coriaceous, sessile or narrowed into a short petiole; on some luxuriant barren shoots they become much larger, membranous, and deeply toothed or lobed. Pedicels solitary or 2 together, about 1 line long, with a pair of minute bracts. Sepals orbicular. Petals about 2 lines long, the erect portion twice as long as the sepals, the obtuse tips spreading or reflexed. Connective of the anthers with a fringed terminal membrane, involute on the edges, the dorsal scale linear, acute, as long as the cells. Female flowers in the normal form pedicellate as well as the males, but smaller, with smaller, usually imperfect anthers. Stigma occasionally 3-lobed, with 3 ovules, although usually 2 only. Berry of a purplish colour, the size of a pea.—*Bot. Mag.* t. 3163; *H. Banksii*, *F. Muell. Pl. Vict.* i. 69.

N. S. Wales, *R. Brown* and others; Wollandilly and Cox's rivers, *A. Cunninghamham*; New England, *F. Mueller*.

Victoria. Shady banks of rivers, creeks, and rivulets, and fissures of rocks to the highest summits of the Australian Alps, *F. Mueller*.



Var. *angustifolia*. Leaves quite entire, linear-oblong or linear-cuneate, obtuse, and not more than 1 in. long. Flowers almost sessile, the dorsal scale of the anthers broadly ob-ovate. In all the flowers I have examined, both the anthers and the style appear to be perfect.—*H. angustifolia*, R. Br. in DC. Prod. i. 315; Hook. f. Fl. Tasm. i. 27.

Tasmania. Northern parts of the island. Port Dalrymple, *R. Bruni*; Launceston and summits of the Western Mountains to 3000–4000 ft., Arthur's Lakes, and Vale of Belvoir, *Gunn, J. D. Hooker*. From the examination of numerous specimens, wild as well as cultivated, I had retained this form as a distinct species; but as E. Mueller assures me that in cultivation it passes into the normal form, I have followed him in uniting it with *H. dentata* as a variety only.

ORDER XI. BIXINÆÆ.

Flowers regular. Sepals 2 to 6, usually 4 or 5 and imbricate. Petals either none, or as many as the sepals, or indefinite, imbricate or contorted in the bud, deciduous. Stamens hypogynous or slightly perigynous, indefinite or very rarely definite. Anthers 2-celled, opening by longitudinal slits or rarely by terminal pores. Torus often bearing glands or a glandular disk. Ovary free, usually 1-celled, with 3 or more, rarely 2 or 1, parietal placentas. Styles or stigmas as many as placentas, free or united. Ovules 2 or more to each placenta, amphitropous or anatropous. Fruit succulent or dry, opening in valves, bearing the placentas in the middle, or indehiscent. Seeds usually few, with a copious and fleshy or rarely thin albumen. Embryo in the axis, straight or curved, the radicle next the hilum, the cotyledons usually broad.—Trees or shrubs, in one genus twiners. Leaves alternate, simple, and often toothed, or rarely palmately lobed or divided. Flowers axillary or terminal, solitary or in clusters, corymbs, racemes, or panicles.

A considerable Order, dispersed over the tropical or warm regions both of the old and the new world. Of the Australian genera, three are common to Asia and Africa, two of the three being also American. The species, however, are all endemic, as is also the fourth anomalous genus.

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|--|--------------------|
| Anthers long, opening in terminal pores. Seeds curved. Trees or shrubs. Leaves digitate. Flowers large | 1. COCHLOSPERMUM. |
| Anthers small, opening longitudinally. Seeds straight. Trees or shrubs. Leaves simple. Flowers small. | |
| Sepals 4 to 6. Petals as many. Anthers with an appendage | 2. SCOLOPIA. |
| Sepals 4 to 6. Petals none. Anthers without any appendage | 3. XYLOSMA. |
| Anthers long, opening longitudinally. Embryo very small. | |
| Stem twining. Leaves simple | 4. STREPTOTHAMNUS. |

1. COCHLOSPERMUM, Kunth.

Flowers hermaphrodite. Sepals 5, imbricate, deciduous. Petals 5, large. Stamens numerous. Anthers oblong or linear, opening in terminal pores or very short fissures. Placentas 3 to 5, projecting more or less into the cavity of the ovary, with numerous ovules. Style simple. Capsule 3- to 5-valved, the membranous endocarp separating from the pericarp. Seeds kidney-shaped or spirally curved, covered with wool or bordered by long hairs.—Trees, shrubs, or rarely undershrubs, usually yielding a yellow juice. Leaves palmately lobed or divided. Racemes loose, few-flowered, in the upper axils or in terminal panicles. Flowers large, yellow.

Besides the four following species, peculiar to Australia, there is 1 known from Southern India, 2 from Africa, and about 5 from South America.

- Calyx and inflorescence densely tomentose. 1. *C. Fraseri*.
 Calyx and inflorescence glabrous or slightly glandular-pubescent.
 Leaves tomentose, with short, rounded, obtuse lobes 2. *C. heteroneurum*.
 Leaves glabrous, with deep ovate-lanceolate or oblong lobes 3. *C. Gillivraei*.
 Leaves glabrous, divided to the base into narrow-oblong, pedate segments 4. *C. Gregorii*.

1. ***C. Fraseri***, *Planch. in Hook. Land. Journ.* vi. 307. Branches glabrous. Leaves unknown. Flowers large, the racemes short, in a loose corymbose panicle, the branches tomentose. Pedicels about $\frac{1}{2}$ in. long, densely tomentose-pubescent. Sepals broadly ovate, very obtuse, tomentose within and without, unequal, the inner larger ones about $\frac{3}{4}$ in. long. Anthers about $1\frac{1}{2}$ lines long.

N. Australia. Melville Island, *Fraser*.

In the absence of the leaves it would have been impossible to distinguish this species from the East Indian *C. gossypium*, but that the anthers are considerably shorter, which may lead one to suppose there may be other differences.

2. ***C. heteroneurum***, *F. Muell. Herb.* Young branches pubescent. Leaves nearly orbicular, cordate at the base, attaining 4 or 5 in. diameter, shortly divided into 5 to 9 broad, rounded, very obtuse, and crenate lobes, tomentose-pubescent when young, nearly glabrous except the principal nerves when old, on petioles of 2 to 3 in. Panicle loose and many-flowered, glabrous, except a slight glandular pubescence on the pedicels and at the base of the calyx. Flowers not so large as in *C. Fraseri*, on pedicels not exceeding $\frac{1}{2}$ in., but lengthening to 1 in. after flowering. Sepals very unequal, quite glabrous, except at the base, with very thin edges, the inner ones about $\frac{1}{2}$ in. long and very broad. Anthers as in *C. Fraseri*. Ovules exceedingly numerous, on 3 parietal placentas partially projecting into the cavity of the ovary. Young capsule slightly tomentose.

N. Australia. Victoria river, *F. Mueller, Wickham*.

3. ***C. Gillivraei***, *Benth.* The specimens are perfectly glabrous, except a very slight pubescence on the branches of the panicle and pedicels. Leaves palmately divided to within $\frac{1}{4}$ or $\frac{1}{2}$ in. of the base, into 5 or 7 ovate-lanceolate or oblong-acuminate slightly toothed lobes, of which the central largest ones are usually 2 to 3 in. long, the 2 outermost short and very acuminate. Panicles short and loose. Flowers as in *C. heteroneurum*, or the sepals rather larger. Capsule obovoid-oblong, rarely 3 in. long, truncate at the top, and very much depressed in the centre. Seeds enveloped in a very deciduous wool.

Queensland. Lizard Island, off the N.E. coast, *McGilveray*; Bundekin river, *F. Mueller*; Port Denison, *Fitzalan*.

4. ***C. Gregorii***, *F. Muell. Fragm.* i. 71. A small tree, quite glabrous, except a very slight glandular pubescence on the branches of the inflorescence and pedicels. Leaves pedately divided to the base into about 7 narrow-lanceolate entire segments, the central ones 2 to 3 in. long, the common petiole 3 to 6 in. Panicles apparently short and not much divided, or reduced to a single raceme. Pedicels about $\frac{1}{2}$ in. long. Sepals and petals as in the last

2 species. Style filiform, slightly thickened towards the top. Outer stamens, as in all the other species, on longer filaments than the inner ones, but the difference is rather more decided in this species. Placentas 5. Fruit not seen.

N. Australia. Rocky barren hills in the S.E. part of Arnhem's Land, *P. Mueller*. The fruit described by F. Mueller from Burckins specimens appears to belong to the *C. Gilivraei*, which has a very different foliage.

2. SCOLOPIA, Schreb.

(Phobros, *Lour.*)

Flowers hermaphrodite. Sepals 4 to 6, slightly imbricate when very young, but open long before flowering. Petals as many and nearly similar. Stamens indefinite, inserted on the thickened torus, with or without glands. Anthers short, the connective terminating in a thick process. Ovary with 3 or 4 placentas and few ovules. Style filiform, with an entire or lobed stigma. Fruit a berry. Seeds 2 to 4, with a hard testa. Cotyledons leafy.—Trees often armed with axillary spines. Leaves simple, with pinnate veins, entire or toothed. Flowers small, in axillary racemes.

The genus is dispersed over southern and eastern Africa and tropical Asia. The Australian species is endemic.

1. **S. Brownii**, *F. Muell. Fragm.* iii. 11. Perfectly glabrous in all its parts. Leaves from ovate to oblong-lanceolate, mostly acuminate, obtuse or almost acute, rarely rounded at the top, $1\frac{1}{2}$ to 3 in. long, always narrowed into a petiole of 3 to 4 lines, entire or slightly undulate-toothed, rather thick and smooth, obscurely triplinerved, but all the veins less conspicuous than in most species, either without glands or with 2 or 3 marginal glands underneath. Racemes short and axillary or forming a terminal panicle of 1 to 2 in. Pedicels 2 to 3 lines. Calyx 4-cleft, smaller than in *S. crenata*, apparently persistent. Petals 4, rather longer than the calyx, deciduous. Stamens numerous, with slender filaments, surrounded by a ring of glands, either distinct and shortly club-shaped or irregularly connate. Anthers small, the process of the connective glabrous and usually as long as the cells. Placentas 3, with about 4 ovules to each. Stigma slightly 3-lobed.

Queensland. Cape York, *M. Gillivray*.

N. S. Wales. Hunter's River, *A. W. Scott*; Clarence river, *W. Lee*; Illawara, *Herb. Mueller*.

This species has much the foliage of some forms of the Indian *C. creata*, but is readily known by the glands of the disk.

3. XYLOSMA, Forst.

Flowers dioecious. Sepals 4 or 5, small, imbricate. Petals none. Male fl.: Stamens indefinite, often surrounded by a glandular disk; anthers short, without appendage. Female fl.: Ovary inserted on an annular disk, with 2 or rarely more placentas, and 2 or few ovules to each; style entire or divided, with dilated stigmas, or rarely stigma sessile. Berry small, indehiscent. Seeds 2 to 8, with a smooth crustaceous testa. Cotyledons broad.—Trees, often thorny. Leaves toothed or rarely quite entire. Flowers small, axillary, clustered, or shortly racemose.

A genus widely dispersed over the tropical and subtropical regions of the new and the old world. The only Australian species is endemic.

1. **X. ovatum**, *Benth.* Glabrous in all its parts, the branches short and slender, rough with lenticels, and, in our specimens, without thorns. Leaves mostly ovate, obtuse, about $1\frac{1}{2}$ in. long, quite entire, narrowed into a very short petiole, thinly coriaceous, with numerous fine reticulate veins; a few lower leaves short and almost orbicular, and the upper ones narrow. Male fl. not seen. Female fl. very small, 5 or 6 together in very short axillary racemes. Pedicels about 1 line long, in the axils of small, ovate, ciliate bracts. Sepals 4, orbicular, ciliate, about $\frac{1}{2}$ line long. Disk deeply lobed or divided. Ovary ovoid, conical, but scarcely tapering into a distinct style, with a broad, thick, slightly 2-lobed stigma. Placentas 2, very prominent, forming a complete dissepiment above the insertion of the ovules, but far from meeting below. Ovules 2 to each placenta.

Queensland. N.E. coast, *A. Cunningham*.

This appears to come nearest to *X. orbiculatum*, Forst., which, judging from Fiji I-land specimens, has a similar almost sessile stigma, but its leaves are much larger and broader, and the ovary has 3 placentas, a 3-lobed stigma, and more than two ovules to each placenta.

4? **STREPTOTHAMNUS**, F. Muell.

Flowers hermaphrodite. Sepals 5, imbricate. Petals 5, much longer than the sepals. Stamens indefinite. Anthers oblong-linear, tipped by a small point, the cells opening longitudinally. Ovary with parietal placentas and numerous ovules; style filiform, with a peltate entire stigma. Fruit a berry. Seeds several, with a hard testa. Embryo very small, at the base of a copious albumen.—Glabrous twiners. Leaves alternate, petiolate, entire, 3-nerved. Peduncles axillary, 1-flowered.

The genus is limited to Australia. It differs from all *Bixineæ*, and approaches *Pittosporæ* in its climbing habit and very small embryo, whilst the floral characters bring it nearer to the tribe *Oncobææ* of *Bixineæ*. The specimens I have seen have so very few flowers, that I have been unable to dissect any myself, and have taken the characters from F. Mueller.

Leaves green on both sides. Disk none 1. *S. Moorei*.
Leaves pale or whitish underneath. Disk toothed 2. *S. Beckleri*.

1. **S. Moorei**, *F. Muell. Fragm.* iii. 28. A perfectly glabrous twiner. Leaves broadly ovate or obscurely cordate, acute or shortly acuminate, 2 to 3 in. long, quite entire, 3-nerved from the base, scarcely paler underneath than above, on petioles of $\frac{1}{2}$ to 1 in. Pedicels about as long as the petioles, 1-flowered. Sepals broad, about 1 line long, persistent. Petals 2 or 3 times as long, rather broad. Stamens very numerous; filaments shorter than the anthers. Berry nearly 1 in. long. Seeds ovoid-globose, about $1\frac{1}{2}$ line diameter, embedded in pulp.

N. S. Wales. Clarence river, *C. Moore*.

2. **S. Beckleri**, *F. Muell. Fragm.* iii. 28. Closely resembles the last species, but differs in the rather more acuminate leaves, paler underneath, a deciduous calyx, the ovary surrounded by a several-toothed disk, a rather longer style, and a more ovoid berry, with smaller seeds. Flowers unknown.

N. S. Wales. Clarence and Hastings rivers, *Beckler*.



ORDER XII. PITTOSPOREÆ.

Flowers hermaphrodite, regular or oblique. Sepals 5, distinct and imbricate, or rarely connate at the base. Petals 5, imbricate, the claws or narrowed base usually erect and connivent or cohering in a tube, rarely spreading from the base. Stamens 5, hypogynous, free, alternating with the petals. Torus small, rarely produced into a short gynophore, sometimes bearing 5 glands. Ovary 1-celled, with 2 or rarely 3 to 5 parietal placentas, or divided into cells by the protrusion of the placentas, which often unite in the axis, at least after flowering. Style simple, with an entire, small, capitate, or dilated stigma. Ovules several, superposed in 2 rows on each placenta, horizontal. Fruit either a capsule opening loculicidally, the valves sometimes splitting also septicidally, or succulent and indehiscent. Seeds several or rarely solitary in each cell, dry or enveloped in pulp, with a thin testa, smooth or rarely muricate, and a hard albumen. Embryo very small, in a cavity of the albumen next the hilum.—Trees, erect shrubs, or undershrubs, with flexuose, decumbent, or twining branches. Leaves alternate, entire, toothed, or rarely lobed, without stipules. Flowers white, blue, yellow, or rarely reddish, terminal or axillary, solitary and nodding, or in short racemes, or corymbose panicles.

With the exception of *Pittosporum* itself, the genera are all limited to Australia.

* *Anthers ovate or oblong. Capsule dehiscent. Petals (except in Bursaria) erect at the base.*

Trees or erect shrubs. Petals erect at the base. Capsule thick or coriaceous. Seeds several.

Seeds thick, not winged. Flowers usually small. 1. PITTOSPORUM.

Seeds flat, horizontal, winged. Flowers large, yellow 2. HYMENOSPORUM.

Erect shrubs, often prickly. Petals small, spreading from the base.

Capsule thin, small, and flat. Seeds 1 or 2 in each cell, vertical, flat 3. BURSARIA.

Undershrubs or twiners. Petals erect at the base. Capsule membranous or thinly coriaceous. Seeds thick or horizontal . . . 4. MARIANTHUS.

** *Anthers ovate or oblong. Berry indehiscent. Petals erect at the base.*

Prickly shrub, with small leaves and small sessile solitary flowers.

Berry globular 5. CHEIROBATES.

Undershrubs or twiners. Flowers pedunculate. Berry ovoid or

oblong 6. BILLARDIERA.

*** *Anthers linear, or longer than the filaments. Petals spreading from the base, or nearly so. Undershrubs or twiners.*

Fruit a berry.

Anthers distant, recurved or revolute, opening longitudinally . . 7. PRONAYA.

Anthers connivent round the style, opening inwards 8. SOLLYA.

Fruit dehiscent. Anthers turned to one side, opening in terminal

porcs 9. CHEIRANTHERA.

1. PITTOSPORUM, Banks.

Petals usually connivent or cohering in a tube at their base or above the middle. Anthers ovate-oblong. Ovary sessile or shortly stipitate, incompletely, or almost completely 2-celled, or rarely 3- to 5-celled; style short. Capsule

globose, ovate or obovate, often laterally compressed; the valves coriaceous or thick and hard, bearing the placentas along their centre. Seeds thick or globular, not winged, often enveloped in a viscous liquor. —Shrubs or trees, glabrous, or rarely tomentose. Leaves usually evergreen, entire or minutely toothed, the upper ones frequently collected into a false whorl. Flowers not large, axillary or terminal, solitary or in close corymbose panicles.

A huge genus, dispersed over the warmer regions of Africa, Asia, the Pacific islands, and New Zealand. The Australian species are all endemic excepting one which is common to eastern tropical Asia and the eastern Archipelago.

Flowers numerous, small, in compound terminal corymbs, with the lower branches axillary.

- | | |
|---|------------------------------|
| Leaves ovate-rhomboid, toothed. Sepals obtuse | 1. <i>P. rhombifolium</i> . |
| Leaves from obovate to oblong or lanceolate, quite entire. Sepals subulate or subulate-pointed. | |
| Young leaves and inflorescence rusty-tomentose | 5. <i>P. ferrugineum</i> . |
| Plant glabrous | 2. <i>P. melanospermum</i> . |
| Peduncles all terminal, clustered, short, each bearing a short simple cyme or umbel. | |
| Glabrous, or the young shoots and inflorescence very slightly pubescent. Flowers about $\frac{1}{2}$ in. long | 3. <i>P. undulatum</i> . |
| Young shoots and inflorescence rusty-tomentose or hirsute. | |
| Flowers about $\frac{1}{2}$ in. Capsule $\frac{3}{4}$ in., very rough | 4. <i>P. revolutum</i> . |
| Flowers 3 to 4 lines. Capsule under $\frac{1}{2}$ in. | |
| Leaves on long petioles, ovate to oblong-lanceolate. Tomentum short and crisp | 5. <i>P. ferrugineum</i> . |
| Leaves nearly sessile, oblong-lanceolate. Tomentum almost hirsute | 6. <i>P. rubiginosum</i> . |
| Pedicels axillary, solitary or clustered, 1-flowered, the uppermost sometimes in a terminal cluster. | |
| Leaves glabrous, flat. Flowers yellow | 7. <i>P. phillyræoides</i> . |
| Leaves revolute on the margins, glabrous above, tomentose or silky underneath. Flowers purple and yellow | 8. <i>P. bicolor</i> . |
| Doubtful species. Leaves very small. Flowers terminal, 1 line long | 9. <i>P. parviflorum</i> . |

1. ***P. rhombifolium***, *A. Cunn. in Hook. Ic. Pl. t. 621*. A tree, attaining, according to A. Cunningham, 60 to 80 ft., glabrous in all its parts. Leaves rhomboid-oval or rarely broadly oblong-lanceolate, mostly 3 to 4 in. long, coarsely and irregularly toothed from the middle upwards, narrowed into a petiole of $\frac{1}{2}$ to 1 in., coriaceous and shining, but with the pinnate and netted veins prominent on both sides. Flower white, numerous, and rather small, in a dense terminal compound corymb, the branches sometimes minutely glandular. Sepals obtuse, rather more than 1 line. Petals oblong, about 3 lines long, spreading from below the middle. Ovary shortly stipitate, the thick placentas nearly meeting, each bearing about 12 to 14 ovules. Capsule more or less obliquely pear-shaped, or almost globular, usually about 3 lines long, and ripening 2 or 3 black seeds.

Queensland. Wide Bay, *Bidehill*; forests on the Brisbane river; *A. Cunningham*; *Aracaria* range, between Brisbane and Dawson rivers and edge of the Killarney scrub, near Warwick, *F. Mueller*.

N. S. Wales. Clarence river. *Herb. F. Mueller*.

This has some general affinity, especially in inflorescence, with the East Indian *P. floribundum*, W. and Arn., but is quite distinct both in foliage and flowers.

2. **P. melanospermum**, *F. Muell. Fragm.* i. 70. A small tree, quite glabrous, or with a scanty minute glandular pubescence on the inflorescence. Leaves from obovate to oblong or even lanceolate, shortly acuminate, micro-nate or obtuse, 2 to 4 in. long, entire and flat or slightly undulate on the margin, narrowed into a petiole of 4 to 5 lines, coriaceous, but not shining, of a pale hue and prominently veined. Corymbs compound, terminal, many-flowered, but shorter than the last leaves. Flowers small, the sepals subulate or lanceolate-subulate, the petals 3 or scarcely 4 lines long, spreading from about the middle. Ovary shortly stipitate, with 10 to 12 ovules to each placenta. Capsule obliquely globular or pear-shaped, somewhat compressed, with few or sometimes a single black seed.

N. Australia. York Sound, *A. Cunningham*; low rocky hills between Victoria river and the Gulf of Carpentaria, *F. Mueller*.

Queensland. Keppel Bay and several points of the N.E. coast, *R. Brown*.

There is one specimen, in the Hookerian herbarium, from *A. Cunningham*, marked Hunter's River; but it is not in any other of the numerous collections we have from that locality, nor from any other station in N. S. Wales.

Var. (f.) lateralis. Corymbs usually lateral. York Sound, *A. Cunningham*; Whitunday Island, *Henne*.

3. **P. undulatum**, *Vent. Hort. Cels.* t. 76. A tree, attaining in favourable situations 40 ft., or according to McArthur, 60 to 90 ft., although in barren exposed localities it remains a shrub, quite glabrous, except a slight appressed pubescence on the young shoots and inflorescence. Leaves from oval-oblong to lanceolate, mostly 3 to 6 in. long and acuminate, flat or undulate on the margin, narrowed into a petiole of $\frac{1}{2}$ to $\frac{3}{4}$ in., coriaceous and shining, with the veins little conspicuous; the upper ones often almost whorled. Peduncles several, in terminal clusters, much shorter than the leaves, mostly bearing a simple cyme or umbel of 3 or 4 rather large white flowers, and one or two often 1-flowered. Sepals lanceolate, acuminate, often connate at the base. Petals 5 to 6 lines long, spreading from the middle. Ovary almost sessile, hairy, the 2 placentas united at the base, each bearing numerous ovules. Capsule nearly globular, rarely attaining $\frac{1}{2}$ in., smooth, with thick coriaceous valves and numerous seeds.—DC. Prod. i. 346; Andr. Bot. Rep. t. 383; Bot. Reg. t. 16; *F. Muell. Pl. Vict.* i. 71 and 224.

N. S. Wales. Common about Port Jackson, *R. Brown, Sieber, &c.* 221 and others; northward to Hastings river, *Beckler*; southward to Murrumbidgee, and Twofold Bay, *F. Mueller*.

Victoria. Banks of rivers in humid forest districts, or rocky places about Western Port, Buchan, Tambo, Broadribb, and Snowy rivers, *F. Mueller*.

4. **P. revolutum**, *Ait. Hort. Kew. ed.* 2, ii. 27. A tall shrub, the young shoots tomentose. Leaves ovate-elliptical or elliptical-oblong, shortly acuminate, 2 to 4 in. long, scarcely undulate, narrowed into a petiole, usually very short, but sometimes near $\frac{1}{2}$ in., coriaceous, glabrous above when full grown, clothed underneath with a loose rusty tomentum easily rubbed off, the upper ones often almost whorled. Peduncles terminal, few or solitary, usually decurved, bearing sometimes a single, rather large flower, but more frequently a short dense ovate or corymbose raceme. Sepals lanceolate-subulate. Petals nearly $\frac{1}{2}$ in. long, often united to above the middle, shortly spreading or recurved at the top. Ovary very hirsute, with very numerous ovules to each

placenta; stigma pellate. Capsule $\frac{1}{2}$ to $\frac{3}{4}$ in. long, the hard almost woody valves rough outside. Seeds numerous, red or brown. —DC. Prod. i. 346; Bot. Reg. t. 186; F. Muell. Pl. Viet. i. 224; *P. fulcum*, Rudge in Trans. Linn. Soc. x. 298, t. 20; DC. l. c.; Sweet, Fl. Austral. t. 25; *P. tomentosum*, Bonpl. Jard. Malm. 56, t. 21; Sweet, Fl. Austral. t. 33; DC. l. c.; *P. hirsutum*, Link, according to Putterl. Syn. Pittosp. 9.

Queensland. Moreton Bay, *Fitzalan*; Brisbane river, *A. Cunningham*.

N. S. Wales. Port Jackson to the Blue Mountains, *R. Brown*, *A. Cunningham*, and others; northward to Hastings and Clarence river, *Beckler*; southward to Twofold Bay, *F. Mueller*.

Victoria. Ridges on the S.E. boundary of Gipps' Land, *F. Mueller*.

In one specimen in the Hookerian herbarium, perhaps in an abnormal condition, the flowers are in shortly pedunculate umbels, both axillary and terminal.

5. ***P. ferrugineum***, *Ait. Hort. Kew. ed. 2. ii. 27*. A tree, flowering sometimes as a shrub, but attaining a height of 50 to 60 ft., the young shoots thickly clothed with a loose rusty tomentum which soon wears off. Leaves from obovate or ovate, and obtuse or scarcely acuminate, to oblong or almost lanceolate, acuminate, and 3 to 4 in. long, quite entire, narrowed into a petiole of $\frac{1}{2}$ to $\frac{3}{4}$ in., rusty tomentose on both sides when very young, but glabrous above, or on both sides when full grown. Peduncles terminal, usually clustered several together above the last leaves, each one bearing a cluster or umbel of rather small flowers, but sometimes the common peduncle grows out and the inflorescence becomes a thyrsoid or pyramidal panicle, not a corymb, as in *P. melanospermum*. Sepals lanceolate or lanceolate-subulate. Petals narrow, about 3 lines long, spreading only above the middle. Ovary villous, with 12 to 16 ovules to each placenta. Capsule sessile, nearly globose, scarcely 4 lines broad, ripening usually 3 or 4 black seeds. —DC. Prod. i. 346; Bot. Mag. t. 2075; *P. tinifolium* (*linifolium* by an error of the press), A. Cunn. in Ann. Nat. Hist. ser. 1, iv. 109; *P. ovalifolium*, F. Muell. Fragm. ii. 78.

Queensland. Moist rocky places, Endeavour river, and Percy Islands, *A. Cunningham*; Frankland Islands, *McGillivray*; dry ridges of Albany Island, *F. Mueller*.

Extends over the Malayan peninsula and adjoining islands, and the Philippines. The Australian specimens have rather larger flowers and narrower-pointed sepals than the common Malayan form; but in this respect the Malacca specimens are very variable, some of them precisely resembling some of the Australian ones; and I have never seen them so obtuse as figured in the 'Botanical Magazine,' even on old specimens preserved from the cultivated shrubs from whence the figure was taken.

6. ***P. rubiginosum***, *A. Cunn. in Ann. Nat. Hist. ser. 1, iv. 108*. Branches, petioles, and inflorescence densely clothed with a rust-coloured tomentum, consisting of much more spreading hairs than in *P. ferrugineum*. Leaves almost whorled, oblong-lanceolate, acutely acuminate, 5 to 6 in. long, entire or slightly sinuate-toothed, narrowed at the base, but almost sessile, herbaceous, glabrous above, softly pubescent underneath. Peduncles in our specimens solitary, terminal, $\frac{1}{2}$ to 1 in. long, bearing an umbel of several flowers very similar to those of *P. ferrugineum*. Fruit unknown.

Queensland. East side of Mount Cook, near Endeavour river, *A. Cunningham*.

7. ***P. phylliræoides***, *DC. Prod. i. 347*. A small graceful tree or slender shrub, quite glabrous in all its parts. Leaves usually oblong- or



linear-lanceolate, with a small hooked point, 2 to 4 in. long, quite entire, narrowed into a petiole, thick coriaceous and indistinctly veined, but in some forms short and broadly oblong, in others long and narrow. Pedicels axillary, solitary or in sessile or shortly pedunculate clusters or umbels, or the uppermost forming a terminal cluster. Flowers yellow, usually about 4 lines long, often dioecious, the females rather larger and fewer together than the males. Sepals short and very obtuse. Petals united to the middle or still higher, spreading at the top. Ovary pubescent, almost completely 2-celled, with 6 to 8 ovules in each cell. Fruit ovate or round-cordate, much compressed, quite smooth, varying from 1 to 9 lines in length, but usually about $\frac{1}{2}$ in. Seeds few, dark or orange-red.—Putterl. in Pl. Preiss. i. 192; F. Muell. Pl. Viet. i. 72; *P. angustifolium*, Lodd. Bot. Cab. t. 1859; *P. longifolium* and *P. Roënanum*, Putterl. Syl. Pittosp. 15, 16; *P. ligustrifolium*, A. Cunn. in Putterl. l. c. 16, and in Ann. Nat. Hist. ser. 1, iv. 110; Putterl. in Pl. Preiss. i. 190; *P. oleaefolium*, A. Cunn. in Putterl. Syn. Pittosp. 17; *P. acacioides*, A. Cunn. in Ann. Nat. Hist. ser. 1, iv. 109; *P. salicinum*, Lindl. in Mitch. Trop. Austr. 97; *P. lanceolatum*, A. Cunn. in Mitch. l. c. 272 and 291.

N. Australia. Upper Victoria river and Sturt's Creek, *F. Mueller*.

Queensland. Brigalow scrub, *Mitchell*; and Burdekin river, Warwick, *F. Mueller*.

N. S. Wales. Narran river and N.W. interior, *Mitchell*; generally dispersed over the interior, *A. Cunningham*.

Victoria. Sandy, barren, or stony declivities and plains dispersed through the desert, *F. Mueller*.

S. Australia. On the coast, *R. Brown*; Kangaroo Island, round Spencer's Gulf and other localities, *F. Mueller*.

W. Australia. Swan River, *Drummond*, *Preiss.* n. 1297; Rottnest Island, *A. Cunningham*, *Preiss.*; Dirk Hartog Island, *A. Cunningham*; Murchison river, *Oldfield*; Abrolhos island, *Bynoe*, *Moore in Herb. Preiss.* n. 1294.

This species, apparently spread over the whole desert country of Australia, cannot be confounded with any other, notwithstanding the variability of the proportions of its leaves, flowers, and fruit. In some of the western specimens the leaves are barely 2 inches long, and fully $\frac{1}{2}$ inch wide, whilst in a large number of eastern and some western ones they attain 4 or 5 inches in length with a breadth of only 2 or 3 lines.

8. **P. bicolor**, *Hook. Journ. Bot.* i. 249. A small tree, attaining in some localities a height of 40 feet, remaining a bush in others, the young branches hoary or rusty, with a close tomentum. Leaves usually crowded, oblong, lanceolate or almost linear, obtuse or with a short recurved point, mostly 1 to 2 in. long, entire, the margins much revolute, nearly sessile or on very short petioles, thick and coriaceous, glabrous above, tomentose or silky underneath. Pedicels from 2 or 3 lines to nearly 1 in. long, axillary, clustered or solitary, usually reflexed, the little bracts at their base numerous and conspicuous, the uppermost pedicels often in a terminal cluster. Sepals oblong or lanceolate. Petals purple and yellow, 4 to 5 lines long, free or nearly so, spreading from above the middle. Ovary villous, with 10 or more ovules to each placenta. Capsule rounded, somewhat compressed, 4 to 5 lines broad, tomentose, the valves not very thick. Seeds usually rather numerous.—*Hook. f. Fl. Tasm.* i. 38; *F. Muell. Pl. Viet.* i. 72; *P. discolor*, *Regel, Gartenfl.* i. 133, t. 15; *P. Huegelianum*, *Putterl. in Endl. Nov. Stirp.* Dec. 43 (from the description given).

N. S. Wales? E. extratropical Australia, *Haegel*. (I have not seen the specimens.)

Victoria. Tree-fern gullies, from Wilson's Promontory to the Delatite river, Dandenong ranges, and Mount Disappointment; also ranges towards Cape Otway and Apollo Bay, and Mount Tambo, ascending to subalpine elevations, *F. Mueller*.

Tasmania. *R. Brown*; throughout the island, abundant in damp ravines, ascending to 4000 ft., *J. D. Hooker*.

Doubtful species.

9. **P. (?) parviflorum**, *Pattendl. in Pl. Preiss.* i. 189. A glabrous erect shrub of 2 ft. Leaves obovate, 4 to 5 lines long, flat or concave, entire. Peduncles terminal, solitary or 2 together, scarcely 1 line long. Flowers scarcely 1 line long. Calyx already fallen from the specimens described. Petals 5, linear-lanceolate, terminated by a dot-like gland. Stamens not seen. Ovary 3-celled, the placentas meeting in the centre, but not united; style filiform; ovules 6 to 10 in each cell. Ripe fruit not seen.

W. Australia. Stony sterile places, York and Wicklow districts, *Preiss, n.* 1290. I have not seen the specimen, but from the description given I much doubt its belonging to the genus or even to the Order.

2. HYMENOSPORUM, *F. Muell.*

Petals connivent or cohering in a tube to above the middle. Anthers ovate-oblong. Ovary incompletely 2-celled; style short. Capsule ovate, compressed, with thick coriaceous valves. Seeds numerous, horizontally imbricated, flat, reniform, surrounded by a membranous wing.—A shrub or tree, with the habit of *Pittosporum*, from which it only differs in its large flowers and in its seeds.

The genus is limited to a single species, endemic in Australia.

1. **H. flavum**, *F. Muell. Fragm.* ii. 77. A handsome evergreen shrub or tree, glabrous, except a loose pubescence on the inflorescence, and sometimes on the under side of the leaves. Leaves ovate-oblong or oblanceolate, acuminate, entire, from 3 to 5 or even 6 in. long, narrowed into a petiole of $\frac{1}{2}$ in. or more, the upper ones often almost verticillate. Panicle terminal, loose, corymbose, often 6 to 8 in. diameter, with small linear or lanceolate bracts. Flowers large, yellow. Sepals oblong-lanceolate, 3 to 4 lines long. Petals silky-tomentose outside, the erect base or broad claws nearly 1 in., the spreading lamina nearly $\frac{1}{2}$ in. long. Ovary linear, silky-tomentose, with numerous ovules. Capsule stipitate, much flattened, fully 1 in. long and nearly as broad. Seeds, including the wing, fully 4 lines broad.—*Pittosporum flavum*, *Hook. Bot. Mag.* t. 4799.

Queensland. Wide Bay district, *Bidwill*; Moreton Bay and Brisbane river, *F. Mueller*; Ipswich, *Vernet*.

N. S. Wales. Paterson's River and Hunter's River, *R. Brown*; Port Stephens, *A. Cunningham*; Macleay river, *Beckler*; Clarence river, *Wilcox*; Lake Macquarie, *Leichhardt*.

3. BURSARIA, *Cav.*

Petals narrow, spreading from near the base. Anthers ovoid. Ovary incompletely 2-celled; style short. Capsule shortly stipitate, flat, broadly orbicular, opening round the edge, with thinly coriaceous flat valves. Seeds 1



Hemerocallis fl.



Abies concolor





Conoclinium coelestinum, L.

or 2 in each cell, flat, reniform, not winged.—Rigid, much branched shrubs or trees, often thorny. Leaves small, entire. Flowers small, in terminal panicles. Sepals very fugacious.

The genus is limited to the following one or perhaps two Australian species.

1. **B. spinosa**, Cav. *lc.* iv. 30, *t.* 350. A shrub or small tree, occasionally attaining the height of 40 ft., in the ordinary state glabrous, and when young very bushy, the smaller branches often reduced to short subulate thorns. Leaves very variable, most frequently clustered, obovate, oblong or cuneate, obtuse, truncate or notched, $\frac{1}{2}$ to 1 in. long, narrowed at the base, and sometimes shortly petiolate, green on both sides; in luxuriant specimens they vary to oblong-lanceolate, 1 to 2 in. long; in a few others they have occasionally a few coarse teeth at the top; and in the var. *incana* they are thicker, and white underneath with a silky tomentum. Flowers white, usually very numerous, in a broad, pyramidal, terminal panicle, arranged along its branches in short racemes, on pedicels of 1 to 3 lines; occasionally the panicles are reduced to short racemes or to 1 or 2 terminal flowers. Bracts minute and very fugacious. Sepals small, also falling off long before the petals open. Petals narrow, about 2 lines long. Capsule 3 to 4 lines or, in the var. *incana*, sometimes 5 lines broad.—DC. *Prod.* i. 347; *Bot. Mag.* t. 1767; Hook. *f.* *Fl. Tasm.* i. 39; F. Muell. *Pl. Viet.* i. 74; *Itea spinosa*, Andr. *Bot. Rep.* t. 314.

N. Australia. About the Gulf of Carpentaria, rare, and only the var. *incana*, F. Muell.; N.E. coast, A. Cunningham.

Queensland. Brisbane river, Moreton Bay, and near Warwick, F. Muell.

N. S. Wales. Common in all forest lands, R. Brown, Sieber, n. 281, and others.

Victoria. Common in all the lowlands as well as in the mountain districts, F. Muell.

Tasmania. Abundant throughout the island, J. D. Hooker.

S. Australia. Extends westward at least to Streaky Bay, F. Muell.

W. Australia. Champion Bay, Oldfield, only the var. *incana*.

Var. (?) *incana*. Young shoots, inflorescence, and under side of the leaves white or hoary, with a soft and dense, or close and thin tomentum. In the original specimens the leaves are 2 to 3 in. long, but they pass gradually, in other specimens, into small obovate or oblong ones. They are, however, usually more robust, and the flowers, and especially the fruits, rather larger than in the normal *B. spinosa*.—*B. incana*, Lindl. in *Mitch. Trop. Austr.* 224. This appears to be the more common variety in the tropical and subtropical regions, and the only one hitherto found in North or West Australia. It extends also southward to the desert tract on the Murray and Snowy rivers, in Victoria. I feel much hesitation in following F. Muell. in uniting the two forms in one species.

A third rather distinct variety, or perhaps a peculiar state of the common one, has very small leaves, numerous thorns, and only very few flowers, with longer and more permanent sepals. Very characteristic specimens were collected on the Glenelg river by Mr. Robertson.

4. MARIANTHUS, Hueg.

(*Calopetalum*, Harv.; *Oncosporum*, Patterl.; and *Rhytidiosporum*, F. Muell.)

Petals connivent at the base or above the middle, spreading at the top. Anthers oblong or ovate, shorter than the filaments. Ovary sessile or shortly stipitate, usually completely 2-celled, glabrous, except very rarely in *M. laxiflorus*. Capsule ovoid or oblong, turgid or slightly compressed, membranous or slightly coriaceous, the valves sometimes splitting septically. Seeds ovoid, reniform or globular.—Undershrubs, with procumbent, flexuose, or more

frequently twining branches. Leaves entire, toothed, or the lower ones occasionally lobed. Flowers blue, white, or reddish, in terminal compact panicles, usually corymbose or almost umbellate, rarely solitary or apparently axillary from the extreme shortness of the flowering branch.

The genus is limited to Australia. It differs from *Billardiera* solely in the capsular not baccate fruit, which is the cause of several species having been described in both genera when the fruit has not been seen. The petals are in general more spreading than in *Billardiera*, but *M. bignoniaceus* has a tubular corolla, and the cymose *Billardieras* have the flowers of *Marianthus*.

SERIES I. Procumbentes.—*Branches short, procumbent or flexuose, not twining. Leaves crowded. Pedicels 1 to 3, terminal. Sepals very pointed. Petals spreading from below the middle. Seeds ovoid-reniform, transverse, and laterally attached.*

Leaves small or heath-like, glabrous or hispid with a few setæ.

Flowering pedicels shorter than the leaves. Seeds much wrinkled 1. *M. procumbens*.

Flowering pedicels much longer than the leaves. Seeds nearly smooth 2. *M. microphyllus*.

Leaves broadly obovate, $\frac{1}{2}$ in. or more, very hairy. Seeds smooth 3. *M. villosus*.

SERIES II. Oncosporeæ. *Twiners. Leaves distinctly petiolate, ovate-lanceolate or lanceolate, very obtuse and cordate at the base. Sepals very acute or subulate. Petals various. Seeds globular, muricate (or tuberculate?).*

Flowers small, in loose terminal racemes or corymbs. Petals spreading from below the middle. Seeds muricate.

Hairs loose, rather rusty. Ovules 3 or 4 in each cell 4. *M. granulatus*.

Hairs silky-white. Ovules numerous 5. *M. parviflorus*.

Flowers rather large, on axillary pedicels. Petals united in a tube above the middle. (Seeds tuberculate?) 6. *M. bignoniaceus*.

SERIES III. Normales.—*Twiners, or rarely branches short and flexuose, or nearly straight. Leaves sessile, or narrowed into a petiole. Sepals very acute or subulate. Petals blue or white, exactly connivent to the middle. Seeds (where known) smooth, nearly globular.*

Pedicels 1 to 3, sessile amongst the last leaves, or axillary.

Leaves narrowed at the base. Ovary glabrous.

Pedicels slender, mostly above $\frac{1}{2}$ in. Ovary distinctly stipitate 7. *M. Drummondianus*.

Pedicels very short. Ovary scarcely contracted at the base 8. *M. tenuis*.

Flowers in terminal corymbs or short racemes, usually numerous.

Upper leaves sessile, obtuse at the base. Corymb or raceme loose and few-flowered 9. *M. laxiflorus*.

Leaves narrowed into a petiole. Corymbs many-flowered.

Flowers blue, often spotted. Sepals very hairy 10. *M. cæruleo-punctatus*.

Flowers white. Sepals rigid, glabrous or slightly hairy.

Leaves lanceolate or linear. Style long and subulate 11. *M. candidus*.

Leaves ovate or broadly lanceolate. Style short and thick, with a broad stigma 12. *M. floribundus*.

SERIES IV. Pictæ.—*Twiners, or rarely branches short and flexuose. Leaves narrowed into a petiole. Sepals ovate or shortly lanceolate. Petals red or streaked with purple, very oblique, and connivent to the middle. Seeds (where known) smooth.*

Filaments dilated, at least at the base. Twiners with red flowers.

Filaments dilated at the base only 13. *M. erubescens*.

Filaments much dilated above the middle 14. *M. ringens*.

Filaments scarcely flattened. Branches flexuose, or slightly twining. Flowers streaked.

Corymbs dense. Pedicels stout, 1 to 2 lines 15. *M. lineatus*.

Corymbs loose, few-flowered. Pedicels slender, 3 to 4 lines 16. *M. pictus*.

1. **M. procumbens**, *Benth.* A low, prostrate or suberect, much branched shrub, the branches sometimes flexuose and nearly 1 ft. long, but usually much shorter, glabrous or slightly pubescent. Leaves crowded and sessile, in the northern varieties usually linear or linear-cuneate, pointed, entire or rarely toothed at the top, 4 to 6 lines long, rigid, with recurved margins; in the southern forms usually shorter, more cuneate or even obovate or ovate, and often toothed. Flowers small, white or tinged with red, solitary or 2 or 3 together, terminal or appearing axillary from the shortness of the flowering shoots, the pedicels 1 to 2 lines long and always shorter than the leaves at the time of flowering, rather longer and recurved when in fruit. Sepals lanceolate-linear, very pointed. Petals about 3 lines long or smaller, spreading from below the middle. Filaments dilated to the middle. Ovules 6 to 8 in each cell of the ovary. Style short. Capsule truncate, 3 lines broad, and not quite so long. Seeds usually 3 or 4 in each cell, ovoid-reniform, transverse and laterally attached, deeply wrinkled.—*Pittosporum procumbens* and *P. nanum*, Hook. Comp. Bot. Mag. i. 275; *Bursaria procumbens*, Putterl. Syn. Pittosp. 20; Hook. f. Fl. Tasm. i. 39; *B. diosmoides*, Putterl. l.c. (from the description, I have not seen Sieber's n. 554); *B. Stuartiana*, Klatt, in Linnaea, xxviii. 568; *Rhytidosporum procumbens*, F. Muell. 1st Gen. Rep. 10; Pl. Vict. i. 75; *Campanthra ericoides*, Lindl. in Mitch. Three Exped. ii. 277.

N. S. Wales. Frequent about Port Jackson and in the Blue Mountains, *A. and R. Cunningham*, and others; extending northward to Clarence river, *Beckler*, and southward to Twofold Bay, *F. Mueller*.

Victoria. Barren forest ridges and heath ground, not generally common although noticed in many localities, more frequent in the eastern part of Gipps' Land, *F. Mueller*.

Tasmania. Common in sandy places throughout the island, *J. D. Hooker*.

2. **M. microphyllus**, *Benth.* Habit of the smaller shorter-leaved forms of *M. procumbens*. Stems apparently procumbent, branched, under 6 in. long, more or less hirsute. Leaves crowded, from obovate to oblong, obtuse, rarely 2 lines long, the margins recurved, all entire in our specimens. Pedicels solitary, terminal, about 3 lines long when in flower, and $\frac{1}{2}$ in. when in fruit, and always several times longer than the last leaves. Flowers larger and apparently darker-coloured than in *M. procumbens*. Petals about 4 lines long, spreading from a little below the middle. Filaments very slightly dilated. Ovules at least 12 to each cell of the ovary. Style rather long. Capsule 3 lines long and not quite so broad. Seeds numerous, smooth or scarcely wrinkled, but not quite ripe in our specimen.—*Oncosporum microphyllum*, Turcz. in Bull. Mosc. 1854, ii. 365; *Marianthus rhytidosporus*, F. Muell. Fragm. ii. 145.

W. Australia, *Drummond*, 5th Coll. n. 242; also *Herb. Mueller*.

3. **M. villosus**, *Benth.* Apparently a low procumbent shrub, with short, slightly flexuose, very hispid branches. Leaves rather crowded, broadly obovate, $\frac{1}{2}$ to near $\frac{3}{4}$ in. long, usually coarsely toothed, narrowed into a short petiole, softly villous on both sides, or becoming almost glabrous above when old. Pedicels terminal or on very short side-branches, solitary or 2 or 3 together, very short at first, and not 2 lines long when in fruit. Petals and stamens not seen. Ovary glabrous, with a long style. Capsule about 4 lines

long and 3 broad, with about 5 seeds in each cell, ovoid-reniform, horizontal, and laterally attached, as in *M. procumbens*, but not wrinkled.—*Oncosporum villosum*, Turcz. in Bull. Mosc. 1854, ii. 365?

W. Australia, Drummond, Coll. 1843, n. 176.

4. *M. granulatus*, Benth. A very slender twiner, the young shoots and leaves loosely clothed with long, soft, spreading hairs, becoming at length glabrous. Leaves distinctly petiolate, ovate-lanceolate or oval-oblong, acute or obtuse, entire, and always obtuse at the base, the larger ones above 1 in. long, those of the side-branches smaller, of a thin texture. Flowers small, 3 to 5 together, in slender racemes or cymes, on filiform pedicels of 4 to 6 lines. Sepals subulate-lanceolate, with long spreading hairs. Petals about 2 lines. Anthers very small. Ovary glabrous, with a subulate style; ovules 3 or 4 in each cell. Capsules nearly orbicular, turgid, membranous, glabrous, about 3 lines long. Seeds globular, strongly muricate.—*Oncosporum granulatum*, Turcz. in Bull. Mosc. 1854, ii. 366.

W. Australia, Drummond, Coll. 1845, n. 210.

5. *M. parviflorus*, F. Muell. Fragm. ii. 144. Very near *M. granulatus*, but not quite so slender, the young shoots silky-white, with long soft hairs. Leaves distinctly petiolate, ovate-lanceolate or almost cordate-ovate, acute or obtuse, the larger ones above 1 in. long, entire, softly hairy, with a very silky margin. Flowers several, in short terminal or leaf-opposed racemes or corymbs, not much longer than the leaves, on pedicels of 2 to 4 or rarely 6 lines. Flowers of *M. granulatus* or rather longer, the petals often 3 lines long. Ovary longer, glabrous, with a short style, and 10 to 12 ovules in each cell. Capsules very turgid, about 2 lines long. Seeds several, globular, muricate.

W. Australia. Plantagenet, Stirling, and Perongrup ranges, Maxwell.

6. *M. bignoniaceus*, F. Muell. in Trans. Phil. Soc. Vict. i. 6, and Pl. Vict. i. 77, t. 10. A very slender twiner, the young shoots silky-white, but soon becoming glabrous. Leaves distinctly petiolate, from ovate to oblong or lanceolate, with a rounded or cordate base, obtuse or acute, quite entire, usually $\frac{3}{4}$ to $1\frac{1}{2}$ in. long, but some of the larger ones above 2 in. Pedicels terminal or from the abortion of the flowering branches, axillary, solitary or 2 or 3 together, filiform, 2 or 3 lines long. Flowers pendulous, of a yellowish or orange colour, $\frac{3}{4}$ to nearly 1 in. long. Sepals small, lanceolate-subulate. Petals united in a tube to far above the middle and only spreading at the top, but soon separating at the base also. Anthers small. Ovary silky-villous, with a very long subulate style, and 6 to 8 ovules to each cell. Capsule oblong, turgid. Seeds globular and apparently tuberculate, but I have not seen them in a good state.

Victoria. Shady rivulets, springs, and cataracts, and fissures of irrigated rocks, Serra and Victoria ranges, and in the Grampians, F. Mueller.

S. Australia. Shady banks of the Onkaparinga and Mount Lofty ranges, ascending to 5000 ft., F. Mueller.

The inflorescence and shape of the flowers are much more those of the majority of *Billardiera* than of *Marianthus*, but the fruit is capsular. It is not *Billardiera latifolia*, Patterl., referred to it by Klatt, in Linnæa, xxviii. 570.



Mephitis blennius L.



Marianthus bignoniaceus. F.M.



7. **M. Drummondianus**, *Benth.* A slender twiner, the young shoots and leaves clothed with long, spreading, very soft, and rather rusty hairs, or rarely glabrous. Leaves from obovate to oblong-lanceolate, mostly acute or with a small recurved point, $\frac{1}{2}$ to 1 in. long, coarsely toothed or almost entire, sessile or narrowed into a very short petiole, the lowest ones sometimes deeply cut. Pedicels terminal, 1 to 3 together, elliptic, hairy, $\frac{1}{4}$ to $\frac{1}{2}$ in. long. Sepals lanceolate-subulate, hairy. Petals about $\frac{1}{2}$ in. long, spreading above the middle. Ovary stipitate, glabrous, with a slender style and 3 to 6 ovules in each cell. Capsule ovoid, very turgid, nearly $\frac{1}{2}$ in. long. Seeds small, globular, smooth.—*Oncosporina Drummondiana*, Putterl. in Pl. Preiss. i. 194.

W. Australia. Gravelly places, Swan River, *Preiss.* n. 1288. *Drummond*, 1st Coll.; Gordon river and Ironstone hills, Tongue river, *Oldfield*; S.W. district, *Menzies* (the specimen almost completely glabrous).

8. **M. tenuis**, *Benth.* A slender twiner, the young shoots with a few soft spreading hairs, but soon glabrous. Leaves lanceolate or oblong or the lower ones almost ovate, acute, 1 to $1\frac{1}{2}$ in. long, entire or with a few coarse distant teeth, narrowed into a distinct petiole. Flowers small, axillary, solitary or in short corymbs of 3 to 5, on pedicels of not above 1 line at the time of flowering. Sepals subulate, hairy. Petals 5 or 6 lines long, spreading from above the middle. Ovary glabrous, with a slender style. Fruit not seen.—*Billardiera parviflora*, DC. Prod. i. 346.

W. Australia. Geographer Bay, *Leschenault*; Flinders Bay, *Collie*; Cape Naturaliste, *Oldfield*.

9. **M. (?) laxiflorus**, *Benth.* A twiner, with the foliage nearly of *Billardiera variifolia*, the flowers and ovary more nearly those of *M. candidus* and its allies. Leaves sessile or nearly so, oblong or lanceolate, the lowest toothed, the others entire, seldom above 1 in. long, glabrous as well as the stem. Flowers apparently white, in loose polunculate corymbose racemes, on slender pedicels, 2 or 3 times as long as the calyx, and much fewer in number and rather smaller than in *M. candidus*. Ovary glabrous or very slightly pubescent. Fruit unknown.

W. Australia, *Drummond*; Cape Leeuwin, *Collie*; between Perth and King George's Sound, *Harvey*; near Kalbar Bridge, Mount Barker, and Perangerup ranges, *Herb. Mueller*.

10. **M. cœruleo-punctatus**, *Klotzsch*, in *Liab. Kl. and Otto*, *l.c.* Pl. 28, t. 12. Very nearly allied to *M. candidus*, and perhaps a small blue-flowered variety. Foliage the same, but usually more pubescent, at least on the under side of the leaves. Sepals smaller and more slender, and always clothed with long brown hairs. Petals as in *M. candidus*, but rather smaller, blue, the upper ones generally, but perhaps not always, spotted in the lower part with a darker colour. Style slender. Capsule oblong, with about 6 smooth globular seeds in each cell, but not seen quite ripe. Putterl. in. Pl. Preiss. i. 196.

W. Australia. Swan River, *Drummond*, 1st Coll. 1813, n. 81. *Preiss*; also, apparently the same, but perhaps without spots, Cape Naturaliste, *Oldfield*.

11. **M. candidus**, *Hay. Enum. S.* A tall twiner, either glabrous or with a slight pubescence on the young shoots, under side of the leaves, and inflorescence. First leaves occasionally toothed or lobed, all the others quite

entire, the lower ones sometimes ovate-lanceolate, 3 to 4 in. long, the upper ones lanceolate or linear, 2 to 3 in. long; acuminate and narrowed into a petiole, or the uppermost almost sessile, rather firm, with recurved margins. Flowers white, usually numerous, in rather dense terminal pedunculate corymbs. Sepals lanceolate, very pointed, rather stiff, 2 to 3 lines long. Petals about 8 lines, obovate, acute, and spreading from above the middle, with narrow erect claws. Ovary glabrous, narrowed into a short stipes, with a subulate style at least as long as the ovary, and small stigma. Capsule oblong.—Putterl. in Pl. Preiss. i. 195.

W. Australia. Frequent about Swan River, *Huegel, Drummond, Preiss, n. 1285*, and others; Flinders Bay, *Collie*.

12. **M. floribundus**, *Putterl. in Nov. Stirp. Dec. 61*.—Allied to *M. candidus*, but a larger plant and quite glabrous. Leaves (of the flowering branches) ovate or very broadly lanceolate, acuminate, 3 to 4 in. long, 1 to 1½ in. broad, quite entire, narrowed into a petiole. Flowers usually numerous in a pedunculate corymb. Sepals lanceolate, very pointed, rigid, about 3 lines long. Petals apparently white, 9 to 10 lines long, spreading from above the middle, and acute as in *M. candidus*. Ovary sessile, narrowed at the top into a very short thick style, with a broad capitate stigma.

W. Australia. King George's Sound, *Huegel, Harvey*; Mair's station on the Tone river, *Clarke*; Mount Clarence, *Oldfield*.

13. **M. erubescens**, *Putterl. in Nov. Stirp. Dec. 60*, and *Pl. Preiss. i. 197*.—Twining from a woody base and quite glabrous. Leaves narrow, oblong-lanceolate or linear, obtuse or scarcely acute, 1 to 2 lines long, entire, narrowed into a petiole, almost coriaceous. Flowers red, 3 or 5, in sessile or shortly pedunculate terminal or axillary corymbs, or rarely solitary, on slender pedicels of 1 to 2 lines. Sepals broadly lanceolate, about 1½ lines long, with scarious edges. Petals about 1 in. long, the laminae very oblique and narrowed into long curved claws. Anthers oblong, the long slender filaments shortly and broadly membranous at the base. Ovary glabrous, with a long slender style. Young fruit as in *M. ringens*.—*M. purpureus*, *Turez. in Bull. Mosc. 1854, ii. 364*.

W. Australia. Swan River, *Huegel, Drummond, Coll. 1843, n. 78*, and *Coll. 1848, n. 96, Preiss, n. 1292*; between Perth and King George's Sound, *Harvey*; Salt river, *Herb. F. Mueller*.

14. **M. ringens**, *F. Muell. Fragm. i. 218*.—Twining from a woody base, and either quite glabrous or with long silky hairs on the young leaves. Leaves from broadly lanceolate to linear-acuminate, 2 to 3 in. long, narrowed into a petiole, coriaceous and quite entire. Flowers red, in dense terminal corymbs usually shortly pedunculate. Sepals oval-oblong or broadly lanceolate, about 2 lines long. Petals very oblique, from ¾ to 1 in. long, with an obovate spreading lamina, the long erect claws rather broad and at first cohering. Filaments much dilated and petal-like, especially above the middle, and suddenly contracted into a short subulate point bearing an oblong anther. Ovary glabrous, with a long filiform style. Capsule oval-oblong. Seeds many, more or less angular.—*Calopetalum ringens*, *Drumm. and Harv. in Hook. Kew Journ. vii. 53*.



W. Australia. Chapman river, *Drummond*; Champion Bay, *Burges*; Murchison river, *Oldfield*; Greenough river, *Walcot*.

15. **M. lineatus**, *P. Muell. Fragm.* i. 217, and ii. 182.—Shrubby and glabrous, with rigidly flexuose or shortly twining branches. Leaves oblong-lanceolate or linear, obtuse or with a minute point, 1 to 2 in. long, narrowed into a short petiole, rather coriaceous. Flowers in dense terminal, almost sessile corymbs. Sepals ovate or ovate-lanceolate, rarely more than 1 line long. Petals 6 to 8 lines, oblique, but less so than in *M. pictus* (yellowish?) with purple streaks, obovate and spreading at the top, gradually narrowed into broad claws. Filaments subulate. Ovary sessile, with a subulate style. Capsule hard, the valves often splitting septically. Seeds numerous, closely packed and much flattened.

W. Australia. Sandy and rocky situations between White Peak and Murchison river, *Oldfield*.

16. **M. pictus**, *Lindl. Swan Riv. App.* 22.—Shrubby and glabrous, with slender twiggy, flexuose or half-climbing branches. Leaves elliptical or lanceolate, obtuse or with a small point, $\frac{1}{2}$ to 1 in. long, narrowed at the base into a short petiole or almost sessile, entire or toothed, rather coriaceous. Flowers few, in short terminal racemes or corymbs, the slender pedicels usually 3 or 4 lines long. Sepals ovate, $\frac{1}{2}$ to $\frac{3}{4}$ line long. Petals 6 to 8 lines, more oblique and curved than those of *M. lineatus*, streaked with purple, narrowed into a short claw. Filaments filiform. Ovary sessile, with a subulate style. Capsule ovoid-oblong, rather coriaceous, the valves splitting septically. Seeds nearly globular or angular. *Oncosporum bicolor*, *Putterl. Syn. Pittosp.* 21, in part, as quoted in *Pl. Preiss.* i. 198.

W. Australia. Swan River, *Drummond*, 1st Coll. and Coll. 1843 n. 77; *Preiss.* n. 1286.

5. CITRIOBATUS, A. Cunn.

(*Ixiosporum*, *F. Muell.*)

Petals connivent or connate to above the middle, in a cylindrical tube spreading at the top. Anthers oblong, shorter than the filaments. Ovary 1-celled, with 2 to 5 parietal placentas; style short. Fruit coriaceous or hard, globular, indehiscent. Seeds few or many, nearly globular, often enveloped in a viscous fluid.—Rigid, much branched shrubs, armed with short thorns or abortive branches. Leaves small, entire or toothed. Flowers small, sessile and solitary, surrounded by small sepal-like bracts.

The genus is limited to Australia.

- | | |
|---|----------------------------|
| Placentas 2, with 8 to 10 ovules each. Fruit 2 to 5 lines diameter, with few seeds | 1. <i>C. multiflorus</i> . |
| Placentas 5, with very numerous ovules. Fruit 1 in. diameter or larger, with numerous seeds | 2. <i>C. pauciflorus</i> . |

1. **C. multiflorus**, *A. Cunn. in Lond. Hort. Brit. (name only)*, and in *Putterl. Syn. Pittosp.* 4. A straggling or prostrate very much branched shrub, with slender branches, rough with a minute pubescence, and bearing numerous subulate thorns or abortive branches. Leaves sessile, ovate, orbicular, obovate, or broadly cuneate, usually 4 to 6 lines long, entire or with a few

small pointed or prickly teeth, rather thin, green and glabrous on both sides. Flowers about 2 lines long, always solitary in the axils, and not very numerous on the bush, notwithstanding the specific name. Ovary pubescent, with 2 parietal placentas, and 8 to 12 ovules to each. Berry 2 to 5 lines diameter, containing from two to above a dozen seeds which are not viscid.

Queensland. Brisbane river, *A. Cunningham*, *F. Mueller*.

N. S. Wales. Damp shady woods and bushy places, Port Jackson to the Blue Mountains, *A. Cunningham* and others; northward to the Macleay, Hastings, and Clarence rivers, *Beckler*; southward to Illawarra, *A. Cunningham* and others.

2. ***C. pauciflorus***, *A. Cunn. in Loud. Hort. Brit. Suppl.* 585 (*name only*).—Habit of *C. multiflorus*, but stouter and more rigid, the branches similarly rough, with a minute pubescence, and thorny. Leaves from obovate to cuneate-oblong, rarely orbicular, mostly entire and obtuse, but occasionally mucronate or truncate and 3-toothed, rarely exceeding $\frac{1}{2}$ in. in length, often petiolate and more rigid than in *C. multiflorus*. Flowers larger than in that species, the petals 4 to 5 lines long, united into a complete tube to $\frac{2}{3}$ of their length. Ovary pubescent, with 5 parietal placentas, covered with innumerable minute ovules. Style longer than in *C. multiflorus*. Fruit attaining 1 to $1\frac{1}{2}$ in. diameter, with a thick coriaceous pericarp. Seeds numerous, in a viscid pulp.—*Ixiosporus spinescens*, *F. Muell. Fragm. Phyt. Austr.* ii. 76.

N. Australia. Careening Bay, N.W. coast, *A. Cunningham*.

Queensland. E. coast, *R. Brown*; in the scrub on the Fitzroy river, *Thozet*; near the Dawson river, *F. Mueller*; Castor creek, *Leichhardt*.

Cunningham's specimen, in leaf with the remains of a fruit, is not authentically named, but there is little reason to doubt its being the one he had in view. There are, also, in the *Hookerian* and in *Mueller's* herbaria specimens in leaf only, which may prove to be one, or perhaps two, additional species of *Citriobatus*, but they are insufficient for determination.

6. BILLARDIERA, Sm.

Petals connivent or cohering in a tube to above the middle, spreading at the top. Anthers oblong or ovate, shorter than the filaments. Ovary sessile or nearly so, completely or rarely imperfectly 2-celled, glabrous or pubescent. Fruit succulent or fleshy and indehiscent, ovoid or oblong. Seeds ovoid, reniform or globular, often enveloped in a viscid pulp.—Undershrubs, with the branches usually twining. Leaves entire or sinuate. Flowers greenish-yellow, purple or rarely blue, either solitary or clustered and pendulous, or in terminal cymes and erect.

The genus is limited to Australia. It differs from *Marianthus* only in the baccate not capsular fruit. The solitary pendulous flowers, frequent in *Billardiera*, are only in one species of *Marianthus*.

Pedicels solitary, or rarely 2 or 3 together.

Petals elongated, slightly spreading at the top. Style long and filiform. Berry turgid, 1-celled

1. *B. longiflora*.

Petals spreading from above the middle. Style short. Berry oblong, 2-celled.

Leaves ovate, linear, or rarely ovate-lanceolate, mostly wavy on the margin

2. *B. scandens*.

Leaves oval or elliptical-oblong, coriaceous, not wavy.

Glabrous. Flowers solitary or very few

3. *B. coriacea*.





- Pubescent or silky-villous. Flowers usually several . . . 4. *B. cymosa*, var.
 Pedicels several, clustered or corymbose (as in *Marianthus*). [*sericophora*.]
 Sepals lanceolate-subulate, flowers corymbose.
 Corymbs distinctly pedunculate. Petals about 5 lines long . . . 6. *B. Lehmanniana*.
 Corymbs sessile, or very shortly pedunculate. Petals 7 or 8
 lines.
 Sepals glabrous or silky pubescent 4. *B. cymosa*.
 Sepals hirsute 5. *B. variifolia*.
 Sepals ovate or ovate-lanceolate. Flowers in sessile clusters,
 usually nodding or pendulous.
 Glabrous. Flowers solitary or very few 3. *B. coriacea*.
 Pubescent or silky villous. Flowers usually several 4. *B. cymosa*, var.
 [*sericophora*.]

(*B. rosmarinifolia*, DC. Prod. i. 345, described from specimens in leaf only, appears to me to be a *Mirbelia*.)

1. ***B. longiflora***, Labill. Pl. Nov. Holl. i. 64. t. 89.—Stems twining, sometimes very short, but often many feet long, glabrous or silky pubescent when young. Leaves from ovate and not above $\frac{1}{2}$ in. long, to lanceolate or linear, and 1 to $1\frac{1}{2}$ in. or rarely 2 in. long, obtuse or rarely acute, entire, tapering into a very short petiole or almost sessile. Flowers greenish-yellow, often changing to purple, pendulous on solitary terminal pedicels of $\frac{1}{2}$ to 1 in. Sepals lanceolate, finely pointed, 2 to 3 lines long. Petals linear-cuneate, 1 to nearly $1\frac{1}{2}$ in. long, erect and shortly spreading at the top, forming an almost tubular corolla. Ovary glabrous or slightly pubescent, with a long subulate style. Berry from nearly globular to narrow-ovoid, turgid, becoming unilocular from the disappearance of the half-dissepiment. Seeds numerous, not enveloped in pulp.—DC. Prod. i. 345; Bot. Mag. t. 1507; Hook. f. Pl. Tasm. i. 37; F. Muell. Pl. Vict. i. 78 and 225; *B. ovalis*, Lindl. Bot. Reg. t. 1719 (with short badly developed flowers); *B. macrantha*, Hook. f. Fl. Tasm. i. 37 (with remarkably long flowers).

N. S. Wales. Twofold Bay, F. Mueller.

Victoria. Along shady rivulets and in damp mountain forests, ascending to subalpine elevations, F. Mueller.

Tasmania, R. Brown; abundant throughout the island in thickets, etc., ascending to 3000 ft., J. D. Hooker.

2. ***B. scandens***, Sm. Bot. Nov. Holl. i. t. 1. Stems twining, often to a considerable extent, or short and flexuose, nearly glabrous or more or less silky or velvety-pubescent, or hairy. Leaves from ovate-lanceolate to lanceolate or linear, obtuse or with a recurved point, usually 1 to 2 in. long, entire or often with undulate margins, usually narrowed into a short petiole. Flowers from greenish or pale yellow to violet or purple, pendulous on slender terminal pedicels varying from a line or two to above $\frac{1}{2}$ in., solitary or very rarely 2 together. Sepals lanceolate or lanceolate-subulate. Petals spreading from above the middle, so as to form a narrow-campanulate corolla, 8 to 10 lines or rarely 1 in. long. Ovary glabrous or pubescent, 2-celled, with a very short style and broad hollow stigma. Berries cylindrical or ovoid-oblong, 2-celled, glabrous or downy. Seeds numerous, in a close double row in each cell and embedded in pulp.—DC. Prod. i. 345; Bot. Mag. t. 801; Sweet, Fl. Austral. t. 54; F. Muell. Pl. Vict. i. 79; *B. latifolia*, Putterl. Nov. Stirp. Dec. 47, but not of Klatt, Linnaea, xxviii. 570; *B. grandiflora*, Putterl. l. c. 48 (all

the above referring to specimens with pubescent ovaries and fruits); *B. mutabilis*, Salisb. Parad. Lond. t. 48; Bot. Mag. t. 1313; DC. Prod. i. 345; Hook. f. Fl. Tasm. i. 37 (with glabrous ovaries and fruits); *B. angustifolia*, DC. Prod. i. 345; *B. canariensis*, Wendl. Hort. Herrenh. t. 15.

Queensland. Wide Bay and Moreton Bay, *F. Mueller*.

N. S. Wales. Port Jackson, *R. Brown*, *Sieber*, n. 495, etc.; northward to New England, *Stuart*; and Hastings river, *Becker*; southward to Twofold Bay, *F. Mueller*.

Victoria. Stony and rocky declivities, chiefly amongst scrub, along rivers, and in moist forest country through the western and eastern parts of the colony ascending to the Alps, *F. Mueller*.

Tasmania. Stiff clayey soils in the northern parts of the island, *J. D. Hooker*.

S. Australia. Mount Gambier, at the S.E. extremity of the colony, *F. Mueller*.

Var. *brachyantha*. Softly hairy. Leaves narrow, undulate. Flowers about 3 together, on shorter pedicels; petals short. Ovary and fruit densely villous; apparently connecting the species with the var. *sericophora* of *B. cymosa*.—*B. brachyantha*, *F. Muell.*; Klatt, in *Linnaea*, xxviii. 570. Buffalo range and Mount Macedon in Victoria, *F. Mueller*, whom I follow in uniting into one species the glabrous and downy-fruited forms of the common eastern *Billardiera*.

3. ***B. coriacea*, Benth.** A tall twiner, either perfectly glabrous or the young shoots slightly silky-hairy. Leaves distinctly petiolate, from broadly oval to elliptical-oblong, obtuse or shortly pointed, mostly $1\frac{1}{2}$ to $2\frac{1}{2}$ in. long, quite entire and coriaceous. Pedicels solitary, or 2 or 3 together, short and terminal. Flowers pendulous, apparently yellow, 8 to 9 lines long, resembling those of *B. scandens*, but more contracted in the middle, the petals slightly spreading above the middle. Sepals ovate-lanceolate, finely pointed. Ovary glabrous or slightly pubescent, 2-celled. Berry cylindrical, very obtuse.—*Pronaya latifolia*, Turcz. in Bull. Mosc. 1854, ii. 363.

W. Australia. S. coast towards Cape Riche, *Drummond*, 5th Coll. n. 240; East Mount Barren and Phillip's ranges, *Maxwell*; Point Henry, *Oldfield*.

4. ***B. cymosa*, F. Muell. in Trans. Vict. Inst. i. 29, and Pl. Vict. i. 80.** Shrubby with the branches more or less twining or sometimes short and flexuose, glabrous or the young parts and inflorescence silky-pubescent. Leaves usually lanceolate or oblong-linear, sessile or nearly so, obtuse or shortly pointed, 1 to 2 in. long. Corymbs, in the typical form, several-flowered, shortly pedunculate or nearly sessile. Sepals, in the same form, lanceolate-stubulate, glabrous or with appressed hairs. Petals 7 to 8 lines long, spreading from above the middle, usually bluish or violet-purple. Ovary glabrous or silky-pubescent, 2-celled. Style short, with a broad hollow stigma. Berry oblong, with numerous seeds embedded in pulp.—*B. cymosa* and *B. pseudocymosa*, Klatt, in *Linnaea*, xxviii. 571.

Victoria. Desert on the Murray river and its lower tributaries, and scrubby barren ridges in Bacchus marsh, *F. Mueller*.

S. Australia. Barren places and scrubby arid ranges from Guichen Bay to Venus Bay and Mount Remarkable, not rare, ranging far inland, and frequent in Kangaroo Island, *F. Mueller*.

Var. (?) *sericophora*. Usually much more silky-villous, especially the young shoots. Leaves usually broader and more distinctly petiolate, sometimes almost ovate. Flowers greenish or pale yellow, few in closely sessile cymes or clusters, and often pendulous. Sepals short, ovate or ovate-lanceolate. Ovary very silky or villous. Berry usually pubescent or villous.—*B. sericophora*, *F. Muell.* in *Linnaea*, xxv. 371; *B. versicolor*, *F. Muell.*; Klatt,

in Linnaea, xviii. 571. Victoria and chiefly South Australia, *F. Mueller*. South coast, *R. Brown*.

I follow *F. Mueller* in referring this to a variety of *B. cyanea*, as he has no hesitation on the point, and it does in a few specimens appear to pass into the typical form, but the majority of specimens seem to me to be rather more nearly connected with the pubescent-fruited forms of *B. scandens*, and would have led me to adopt it as an independent intermediate species.

5. **B. variifolia**, *DC. Prod.* i. 346. Shortly twining, with the young shoots and inflorescence more or less hirsute, with short hairs. Leaves sessile or nearly so, oblong or lanceolate and entire, or the lower ones broader, cuneate and deeply toothed, the longest seldom above 1 in. long. Flowers blue, on very short hirsute pedicels, in terminal corymbs, usually dense and sessile, rarely looser, few-flowered, and shortly pedunculate. Sepals lanceolate-subulate, hirsute with spreading hairs. Petals about 4 to 6 lines long, spreading from the middle. Ovary densely villous, with a short subulate style. Berry cylindrical, narrow, acuminate, $\frac{3}{4}$ to 1 in. long. — *Marianthus caulescis*, *Putterl. Syn. Pittosp.* 23; *Pronaya Huegeliana*, *Putterl. in Pl. Preiss.* i. 204; *Pronaya sericea*, *Turez. in Bull. Mosc.* 1854, ii. 363, and probably *P. lanceolata*, *Turez. l. c.* 364, which I have not seen.

W. Australia. Common about King George's Sound, *R. Brown, Labillardiere, A. Cunningham* and others, to the Perongerrup ranges, *Macquell*; also *Drummond, n.* 97.

Var. ϵ , *rigida*. Branches shorter, scarcely twining. Leaves crowded, narrow, rigid, above $\frac{1}{2}$ in. long, recurved at the top, with the margins revolute. Perhaps a distinct species. — *Marianthus caustus*, *Putterl. Syn. Pittosp.* 23, from the character given. — With the typical form, *Fraser, Drummond*, and others.

6. **B. Lehmanniana**, *F. Muell. Pl. Vict.* i. 78. Glabrous except a very slight pubescence on the inflorescence, with numerous erect or shortly twining leafy branches. Leaves sessile or nearly so, oblong-linear, usually obtuse, $\frac{3}{4}$ to $1\frac{1}{2}$ in. long, rather firm and flat. Flowers numerous, in pedunculate terminal corymbs on slender pedicels. Sepals lanceolate-subulate. Petals about 5 lines long, narrow-obovate, pointed, spreading from the middle. Anthers short, sometimes slightly recurved. Ovary glabrous, 2-celled, with a short style. Berry cylindrical. — *Marianthus angustifolius*, *Putterl. in Pl. Preiss.* i. 200; *Pronaya angustifolia*, *Lehm. in Pl. Preiss.* ii. 233.

W. Australia. Swan River, *Drummond, Coll.* 1843, *n.* 79, and 5th *Coll. n.* 241, *Preiss, n.* 1287.

7. PRONAYA, Hueg.

Petals spreading nearly from the base. Anthers narrow-oblong, about as long as the filaments, recurved or revolute as soon as the flower opens. Ovary imperfectly 2-celled, pubescent. Fruit succulent, oblong, indehiscent. Seeds globular or angular.

The genus is limited to the following single Australian species, only differing from *Billardiera*, with which *F. Mueller* proposes to unite it, in the more spreading corolla and in the anthers; the habit is that of the cymose *Billardieras* or of *Cheiranthera*.

1. **P. elegans**, *Hueg. Bot. Archiv.* t. 6. Usually twining, with a close silky pubescence on the young shoots and inflorescence, the older leaves and branches glabrous. Lower leaves often coarsely toothed or lobed, the others sessile or nearly so, lanceolate or linear-lanceolate, 1 to $1\frac{1}{2}$ in. long, entire,

rather firm, the margins recurved. Flowers bluish or white, in a dense terminal corymb, sessile amongst the last leaves. Petals about $\frac{1}{2}$ in. long, ovate, more spreading than in any *Billardiera* although less so at the base than in *Sollya*. Ovary tomentose, and berry oblong-cylindrical, very much like those of *Billardiera variifolia*.—Putterl. in Pl. Preiss. i. 203, Paxt. Mag. Bot. xii. 99, with a fig.; *Spiranthera Fraseri*, Hook. in Bot. Mag. under t. 3523; *Campylanthera Fraseri*, Hook. Ic. Pl. t. 82.

W. Australia. Common about Swan River, *Fraser*, *Huegel*, *Drummond*, and others.

Var. *minor*. More slender, and smaller. Leaves mostly about $\frac{1}{2}$ in. long. Flowers smaller.—*P. speciosa*, Endl. in Hueg. Enum. 9:—S. coast, *R. Brown*, whose specimens agree with the character given by Endlicher from Bauer's specimens. The other described *Pronayas* are true *Billardieras*.

8. *SOLLYA*, Lindl.

Petals spreading from the base, obovate. Anthers longer than the filaments, connivent in a cone round the pistil, and opening inwards by longitudinal slits. Ovary 2-celled, with a short style. Berry oblong. Seeds embedded in pulp.—Twining. Leaves narrow. Flowers nodding, on slender pedicels, in terminal loose few-flowered cymes, or rarely solitary.

The genus is limited to Australia.

Peduncles several flowered. Petals 4 to 5 lines. Berry oblong-cylindrical, with closely packed seeds

1. *S. heterophylla*.

Peduncles filiform, 1- to 3-flowered. Petals 3 lines. Berry slender, with few seeds

2. *S. parviflora*.

1. ***S. heterophylla***, Lindl. Bot. Reg. t. 1466. (Glabrous or the young shoots, under side of the leaves, and inflorescence more or less silky-hairy. Stems flexuose or twining, from a woody base. Leaves from ovate-lanceolate to ovate-oblong, and $1\frac{1}{2}$ to 2 in. long or rather more, to lanceolate or oblong-linear, and 1 to $1\frac{1}{2}$ in., obtuse or slightly acuminate, rather coriaceous, quite entire, usually narrowed into a very short petiole. Cymes terminal or leaf-opposed, drooping, usually 4- to 8-flowered, but sometimes with 12 or more flowers. Pedicels slender. Sepals narrow, acute, about 1 line long. Petals 4 to 5 lines. Ovary silky-pubescent. Berry cylindrical, obtuse, about $\frac{3}{4}$ in. long and fully 3 lines thick, with a thin succulent pericarp. Seeds numerous, closely packed in two rows in each cell, more or less angular or flattened by mutual pressure.—Bot. Mag. t. 3523; Putterl. in Pl. Preiss. i. 203; *Billardiera fusiformis*, Labill. Pl. Nov. Holl. i. 65. t. 90; DC. Prod. i. 345.

W. Australia. Common about King George's Sound, *R. Brown*, *Labillardière* and others, extending eastward along the coast beyond Stokes Inlet, *Maxwell*; inland to Stirling range, and perhaps to Swan River, *Drummond* and others.

Var. *angustifolia*. Branches less twining. Leaves narrow-lanceolate.—*S. linearis* Lindl. Bot. Reg. 1840, t. 3. S. coast, *R. Brown*, *Fraser*, *Drummond*, etc.

2. ***S. parviflora***, Turcz. in Bull. Mosc. 1854, ii. 361. Very much more slender and twining than *S. heterophylla*, usually sprinkled with soft loose hairs. Leaves lanceolate or oblong-linear, the larger ones often rather more than 1 in. long, but in some specimens all under $\frac{1}{2}$ in., very shortly petiolate and thinner than in *S. heterophylla*. Flowers small, solitary, or 2 or 3 in a cyme, on very fine filiform pedicels. Petals about 3 lines long. Berry $\frac{1}{2}$ to

17157
Lilium. *Lilium*



Lilium



Heiranthus lineatus, L. Thunb.

$\frac{3}{4}$ in. long, $1\frac{1}{2}$ to 2 lines broad, tapering at both ends. Seeds globular, much fewer than in *S. heterophylla*.

W. Australia. *Drummond*, *Ath Coll.* n. 99, *5th Coll.* n. 238; Kojonerup hills, *Herb. Mueller*.

Xerosollya Gilbertii, Turcz. in Bull. Mosc. 1854, ii. 362, which I have not seen, may be the same plant. The description agrees in every respect, even to the peculiar form of the fruit, except that he describes the latter as dry and 2-valved, and it appears to be succulent in *S. parviflora*.

Sollya Drummondii, Morren, and *S. salicifolia*, Marnock, published in gardening works, not in our botanical libraries, are unknown to me, but are most probably garden varieties of *S. heterophylla*.

9. CHEIRANTHERA, A. Cunn.

Petals spreading from nearly the base, obovate-oblong. Anthers longer than the filaments, all turned towards one side, opening by two pores at the top. Ovary 2-celled with a subulate style. Capsule oblong, hard, opening loculicidally in 2 valves, the valves also splitting septicidally. Seeds nearly globular.—Branches flexuose or twining. Leaves narrow. Flowers in terminal corymbs or cymes, or drooping from terminal solitary pedicels.

The genus is limited to Australia.

Flowers several, corymbose.

Leaves flat or concave. Sepals lanceolate. Anthers not twice as long as the filaments, and not attaining half the length of the petals 1. *C. linearis*.

Leaves thick or terete. Sepals narrow. Anthers fully twice as long as the filaments and exceeding the half of the petals 2. *C. filifolia*.

Flowers solitary, on slender terminal pedicels.

Leaves linear-terete or involute 3. *C. volubilis*.

Leaves linear, flat, or revolute 4. *C. parviflora*.

1. **C. linearis**, A. Cunn. in Bot. Reg. under t. 1719. A low glabrous shrub or undershrub, with erect twiggy branches of 6 in. to 1 ft., or rarely longer. Leaves linear, acute or rather obtuse, $\frac{3}{4}$ to $1\frac{1}{2}$ in., or rarely 2 in. long, entire or minutely toothed, flat, and $\frac{1}{2}$ to 1 line broad, or the margins incurved, so as to be almost terete, with smaller leaves often clustered in the axils. Flowers blue and showy. Sepals lanceolate, 2 to $2\frac{1}{2}$ lines long. Petals 8 to 10 lines. Filaments short. Anthers rather longer, but not reaching to the middle, and often not $\frac{1}{3}$ of the length of the petals. Capsule very like those of *Marianthus pictus* and *lineatus*, oblong, much flattened, hard but dehiscent when quite ripe.—Hook. Ic. Pl. t. 47; Fl. des Serres, viii. t. 856; F. Muell. Fragm. i. 97; Pl. Vict. i. 76; *C. cyanea*, Brongn. Voy. Coq. t. 77.

N. S. Wales. Brushy forest country at the foot of Croker's range, frequent near Bathurst, A. Cunningham; near Clifton in New England, C. Stuart.

Victoria. Barren stony ridges and hills, Mount M'Ivor, and near the Ovens range, F. Mueller.

S. Australia. Mount Barker, Whittaker; Flinders range, Kangaroo island, Spencer's Gulf and St. Vincent's Gulf, F. Mueller.

2. **C. filifolia**, Turcz. in Bull. Mosc. 1851, ii. 364. Allied to *C. linearis*, but the branches are more slender and often flexuose or almost twining. Leaves very narrow, thick or almost terete, obtuse or scarcely pointed, some-

times none of them exceeding 3 or 4 lines, at others the upper ones above 1 in. long. Flowers blue, smaller than in *C. linearis*. Sepals linear or narrow-lanceolate, 1 to 2 lines long. Petals 5 to 6 lines. Anthers longer and narrower than in *C. linearis*, usually twice as long as the filaments, and exceeding the half and often reaching two-thirds of the petal.—*C. tortilis*, F. Muell. Fragm. ii. 79.

W. Australia. S. coast?, *Drummond*, Coll. 1850, n. 91, *Oldfield*; river entering Stokes Inlet, *Marxwell*.

Var. *brevisfolia*. Branches short, with crowded leaves, mostly 3 to 4 lines long.—*C. brevisfolia*, F. Muell., Fragm. i. 97, and ii. 180; Phillips' range, also Plantagenet and Stirling ranges, F. Mueller. Drummond's specimens connect the short-leaved with the long-leaved forms.

3. ***C. volubilis*, Benth.** A slender glabrous twiner. Leaves narrow-linear, thick, with the margins involute or terete, with a short recurved point, mostly about $\frac{1}{2}$ in. long. Peduncles slender, terminal, with a single drooping flower. Sepals lanceolate or linear-lanceolate, about 2 lines long. Petals about $\frac{1}{2}$ in. Anthers scarcely so long as the filaments, very obtuse, and not reaching to the half of the petals. Ovary shorter than in *C. linearis*, with a long subulate style. Fruit not seen.

S. Australia. Scrub in Kangaroo Island, *Waterhouse*.

4. ***C. parviflora*, Benth.** Slender and glabrous or slightly pubescent, the branches either short and flexuose or elongated and twining. Leaves sessile or nearly so, from broadly oblong-lanceolate or almost ovate-lanceolate and $1\frac{1}{2}$ in. long to linear and $\frac{1}{2}$ in. or less, usually obtuse and the margins always revolute, sometimes slightly hirsute on the upper side. Flowers as in *C. volubilis*, on long terminal simple filiform peduncles, but smaller. Sepals seldom above 1 line, petals about 4 or 5 lines long. Anthers rather longer than the slender filaments and reaching to about half the length of the petals. Ovary glabrous, with a subulate style.

W. Australia, *Drummond*, Coll. 1843, the specimens n. 34, very twining, with larger and broader leaves, and n. 80 less twining, with smaller narrower leaves.

C. Preissiana, Putterl. Pl. Preiss. i. 201, if a *Cheiranthera* at all, differs from the last species in its hirsute branches and leaves, but the flowers are unknown, and the fragments I have seen are in leaf only, something like those of *Bilhardiera variifolia* or of *Proneysa elegans*.

ORDER XIII. TREMANDREÆ.

Flowers regular. Sepals 4 or 5, very rarely 3, free, valvate in the bud. Petals as many, hypogynous, spreading, induplicate-valvate in the bud. Stamens twice as many, hypogynous, free; filaments short; anthers oblong or linear, 2- or 4-celled, opening in a single terminal pore. Torus small or rarely expanded into a disk between the petals and stamens. Ovary sessile or nearly so, usually 2-celled; style filiform, deciduous, entire or minutely 2-lobed. Ovules solitary in each cell, or 2, one above the other, or rarely an additional small collateral one, pendulous, anatropous, with a ventral raphe. Capsule usually flattened, 2-celled, opening loculicidally at the edges. Seeds pendulous, the raphe usually expanded at the chalazal extremity into a twisted or strophiole-like appendage, rarely wanting; the testa crustaceous, glabrous



or hairy; albumen fleshy or almost cartilaginous. Embryo small, straight, with a superior radicle.—Shrubs usually heath-like, glabrous or glandular-hairy, with small alternate opposite or verticillate leaves, rarely with a stellate tomentum and larger leaves. Flowers solitary, on axillary pedicels, usually red or purple. In many species, as in *Pittosporæ* and *Polygalæ*, a flower may here and there be found with a 3-merous ovary and fruit.

The Order is strictly confined to Australia, and although showing some affinity with *Chloranthera* in *Pittosporæ*, as well as with *Polygalæ* proper, it is yet very different from either; the connection with *Lasiopetalæ*, insisted upon by Steetz, appears to rest almost entirely on the valvate calyx, and on an occasional resemblance in habit, which is, however, partaken in by *Banera* and several other genera of Australian heath-like shrubs, which have little else in common.

Anthers continuous with the filament. Leaves alternate or whorled, glabrous or glandular hairy.

Anthers 2-celled, or with 4 cells, 2 in front of the 2 others. Seeds with an appendage at the chalazæ

1. TETRATHECA.

Anthers 4-celled, the 4 cells on the same plane. Seeds without appendage

2. PLATYTHECA.

Anthers articulate on the filament. Leaves opposite, with stellate hairs. Seeds with an appendage

3. TREMANDRA.

1. TETRATHECA, Sm.

Stamens apparently in a single series, the anthers continuous with the filament, 2-celled, or 4-celled with 2 of the cells in front of the 2 others, more or less contracted into a tube at the top. Disk none. Capsule opening only at the edges. Seeds with an appendage at the chalazal end usually contorted.—Glabrous or glandular-hairy. Leaves alternate, verticillate or scattered, heath-like and entire, or flat and toothed, or reduced to minute scales.

§ 1. *Stems terete, leafy (except T. subaphylla). Ovules 1 or 2 in each cell. Seeds hairy.* (Eastern or southern species.)

Leaves mostly verticillate. Ovules usually 2, superposed, or, if solitary, attached below the summit of the cell.

Leaves ovate, obovate, or orbicular, flat. Sepals ovate, obtuse or scarcely acute, often reflexed

1. *T. ciliata*.

Leaves ovate to lanceolate, acute, with the margins recurved. Sepals acute or acuminate, not reflexed

2. *T. thymifolia*.

Leaves linear, the margins revolute. Sepals not reflexed

3. *T. ericifolia*.

Leaves rarely subverticillate. Ovules solitary, suspended from the summit of the cell.

Very glandular. Leaves elliptical-oblong or obovate, much narrowed at the base. Petals large, obovate

4. *T. glandulosa*.

Glabrous or hispid, rarely glandular. Leaves linear, or, if broader, obtuse at the base. Petals oblong or scarcely obovate

5. *T. pilosa*.

Glabrous and somewhat glaucous. Leaves all, or nearly all, reduced to minute scales

6. *T. subaphylla*.

§ 2. *Stems very angular or flat, almost leafless. Ovules 2 or 4 in each cell. Seeds hairy.* (Eastern and western species.)

Stems often 3-angled. Flowers 4-merous. Anther-tubes very short

7. *T. juncea*.

Stems flat, 2-winged. Flowers 5-merous. Anther-tubes long

8. *T. affinis*.

§ 3. *Stems terete, leafy, or almost leafless. Ovules solitary in each cell. Seeds glabrous and shining.* (Western species.)

Leaves minute and distant, or linear-terete and alternate.

Leaves minute and distant. Flowers 5-merous. Ovary glandular-hirsute 9. *T. nuda*.

Leaves either minute and distant or not crowded. Flowers 4-merous.

Ovary glabrous 10. *T. virgata*.

Leaves crowded. Flowers 5-merous. Ovary glandular-hirsute 11. *T. confertifolia*.

Leaves alternate, lanceolate or ovate.

Leaves glabrous underneath, except the setæ of the midrib 12. *T. setigera*.

Leaves softly pubescent underneath.

Leaves ovate, flat. Setæ long and numerous 13. *T. hispidissima*.

Leaves lanceolate, much revolute, occasionally verticillate. Setæ
RIFE 14. *T. hirsuta*.

Leaves mostly verticillate or opposite.

Leaves villous underneath, often alternate 14. *T. hirsuta*.

Leaves glabrous underneath or pubescent on the midrib, verticillate
in threes or fours, very rarely alternate.

Anthers purple, the tubular process as long as the cells.

Leaves glabrous or ciliate, or rarely hirsute above 15. *T. viminea*.

Leaves coriaceous, scabrous or pubescent, not ciliate 16. *T. pubescens*.

Anthers yellow, contracted into a very short tube 17. *T. pilifera*.

Leaves membranous, lanceolate-linear, flat, opposite or verticillate.

Anthers very short and curved, with a slender tube 18. *T. filiformis*.

1. ***T. ciliata***, Lindl. in *Mitch. Three Exped.* ii. 206. An undershrub with slender erect or diffuse stems, of 1 to 2 or rarely 3 ft., very shortly and roughly pubescent or glabrous. Leaves almost all verticillate in threes or fours, broadly ovate or nearly orbicular, obtuse or slightly pointed, rarely exceeding $\frac{1}{2}$ in. and mostly smaller, the margins flat or scarcely recurved, ciliate or rarely glabrous. Pedicels usually longer than the leaves. Sepals broadly ovate, obtuse or scarcely acuminate, about 1 line long, more spreading than in the following species, and sometimes reflexed, bearing like the pedicels a few black glandular hairs or setæ. Petals obovate-oblong, about $\frac{1}{2}$ in. long. Anther-tubes short. Ovary pubescent, with 2 superposed ovules in each cell, and occasionally a third collateral one. Capsule broad, 2 to 4 lines long. Seeds hairy.—Hook. Ic. Pl. t. 268; Hook. f. Fl. Tasm. i. 34; F. Muell. Pl. Vict. i. 181; *T. bancroftia*, F. Muell. in Schuch. Syn. Trem. 29.

Victoria. Port Phillip, *R. Brown*; frequent on heathy ground and barren forest ridges in many parts of the colony, not ascending to the Alps, *F. Mueller*, *Mitchell*, and others.

Tasmania. Sandy heaths, Port Dalrymple, *R. Brown*; mouth of the Tamar and other parts of the north of the island, *Gunn*.

2. ***T. thymifolia***, Sm. *Prodr. Bot.* i. 11. t. 22. Intermediate between *T. ciliata* and *T. ericifolia*, it has usually the tall habit of the former, but is much more pubescent or hirsute. Leaves almost all verticillate in threes or fours, ovate-elliptical or lanceolate, the margins more or less recurved or revolute. Flowers of *T. ciliata*, except that the sepals are usually ovate-lanceolate, more acute or acuminate than in either of the two allied species, and seldom reflexed. Ovary glabrous, or more frequently pubescent. Ovules fruit and seeds of *T. ciliata*.—DC. Prod. i. 343.

Queensland. Glasshouses, Moreton Bay, *F. Mueller*.

N. S. Wales. Port Jackson to the Blue Mountains, *Herb. Smith*, *A. Cunningham*.

and others; brushy forest north of Bathurst, *A. Cunningham*; northward to Hastings river, *Beckler*, and southward to Twofold Bay, *F. Mueller*.

Victoria. Heathy mountain tracts, frequent, *F. Mueller*.

F. Mueller considers this and the two following species as varieties only of *T. pilosa*, but *T. thymifolia*, especially the broad-leaved Queensland form, appears to me nearer to *T. ciliata* than to *T. ericifolia*, and I cannot find the more or less open calyx so constant a character as the foliage, indefinite as that may often be. At any rate, if the whole series be divided into two species, the one would seem rather to include *T. ciliata*, *thymifolia*, and *ericifolia*, with leaves mostly verticillate, pedicels usually longer than the leaves, and ovules generally two, superposed; whilst the other, formed of *T. glandulosa* and *pilosa*, has the leaves scattered, rarely verticillate, the pedicels short, and ovules solitary in each cell, inserted at the top.

3. ***T. ericifolia***, *Sm. Exot. Bot. i. 37. t. 20.* A heath-like undershrub, more branched and diffuse than the two preceding species, rarely attaining 1 ft., minutely and roughly pubescent or nearly glabrous, very rarely shortly hirsute. Leaves mostly verticillate, but not so regularly so as in the last two species, narrow-linear, with the margins closely revolute or rarely oblong-lanceolate and more open, mostly under $\frac{1}{2}$ in. Flowers on slender pedicels, usually longer than the leaves. Sepals as in *T. ciliata*, ovate, obtuse or scarcely acute, but not reflexed. Ovary glabrous or rarely pubescent, with 2 superposed ovules in each cell, or rarely a single ovule attached below the top of the cell. Capsule obovate-cuneate. Seeds hairy. DC. Prod. i. 343; Rudge, in Trans. Linn. Soc. viii. t. 11.

N. S. Wales. Very abundant about Port Jackson, *R. Brown*, *Sieber, n. 234.* and others.

Var. *rubicoides*. Leaves broader, less revolute and more regularly verticillate, almost like those of *T. thymifolia*, but glabrous or shortly pubescent, and the sepals obtuse as in *T. ericifolia*. *T. rubicoides*, *A. Cunn. in Field. N. S. Wales, 335.*—Rocky declivities of the Blue Mountains, *A. Cunningham*.

4. ***T. glandulosa***, *Labill. Pl. Nov. Holl. i. 96. t. 123.* Rather coarse and much branched, often exceeding 2 ft. in height, more or less densely pubescent or hirsute with glandular hairs. Leaves scattered, not verticillate, usually elliptical-oblong, acute or obtuse, 3 to 5 lines long, the margins rigidly ciliate or almost toothed and slightly revolute, always narrowed at the base. Pedicels rarely exceeding the leaves. Sepals ovate, acute, about 1 line long. Petals broad, about 4 or 5 lines. Anther-tubes often more elongated than in the allied species. Ovary glandular, with 1 ovule, suspended as in *T. pilosa* from the summit of each cell, with very rarely a second collateral abortive one. Capsule obovate. Seeds hairy.—DC. Prod. i. 343; Hook. f. Fl. Tasm. i. 34.

Victoria. Ranges near Avon river in Gipps' Land, and dry scrubby hills between Owens and Broken River, *F. Mueller*. Some of the Avon river specimens referred here by *F. Mueller*, have the leaves remarkably broad, sometimes almost orbicular.

Tasmania. Derwent river, *R. Brown*; heathy places abundant throughout the island, *J. D. Hooker*.

The N. S. Wales specimens, often referred to this species, belong to the following one.

5. ***T. pilosa***, *Labill. Pl. Nov. Holl. i. 95. t. 122.* Much branched and heath-like, glabrous or hispid, but not generally glandular, and seldom much exceeding 1 or $1\frac{1}{2}$ ft. in height. Leaves usually linear, with the margins much revolute, 4 to 6 lines long, but in very luxuriant shoots they are sometimes broadly lanceolate or oblong, but with an obtuse base. Flowers scarcely

so large as in *T. glandulosa*, and often much smaller with narrow petals, the pedicels usually shorter than the leaves. Sepals ovate, obtuse or acute. Ovary glabrous or pubescent, with a single ovule suspended from the summit of each cell. Capsule obovate. Seeds hairy.—DC. Prod. i. 343; Hook. f. Fl. Tasm. i. 35; *T. ericoides*, Planch. in Fl. des Serres, x. 229, t. 1065; *T. calva*, Schuch. Syn. Trem. 25; *T. ericifolia*, var., F. Muell. Pl. Vict. i. 182.

N. S. Wales. About Port Jackson, but apparently rare.

Victoria. Not frequent, *F. Mueller*.

Tasmania. Port Dalrymple, etc., *R. Brown*; abundant throughout the island, *J. D. Hooker*.

S. Australia. Lofty ranges, *Whittaker*; common towards Spencer's Gulf, *F. Mueller*.

Var. *denticulata*, with narrow revolute leaves, as in *T. pilosa*, but with a few glandular hairs on the calyx and pedicels, the leaves occasionally opposite, thus in some measure connecting *T. pilosa* with *T. ericifolia*, but the flowers and ovules are those of the former. —About Port Jackson, from several collections, — *T. denticulata*, Sieb. Pl. Exs. n. 236, and in Spreng. Syst. Cur. Post. 147; *T. glandulosa*, Sm. Exot. Bot. i. 39, t. 21, Rudge, in Trans. Linn. Soc. viii. 294, t. 10, but not of Labillardière.

Var. (?) *procumbens*. Glabrous, procumbent, slender, and much branched, with smaller flowers on shorter pedicels than in the common state of *T. pilosa*. — *T. procumbens*, Gunn, in Hook. f. Fl. Tasm. i. 35, t. 7, A. (with red flowers); *T. calva*, β , *pulchella*, Schuch. Syn. Trem. 27; *T. Gunnii*, Hook. f. Fl. Tasm. i. 36, t. 7, B. (with numerous white flowers). —On the Western Mountains of Tasmania, and on heathy plains near the sea, *Gunn*; Port Dalrymple, *R. Brown*; the slender white-flowered variety on the Asbestos Hills.

I have considerable doubts whether this elegant Tasmanian variety may not prove permanently distinct.

6. ***T. subaphylla***, *Benth.* Stems almost leafless, erect or flexuose, rush-like, terete, branching, often 1 to 2 ft. long, glabrous and somewhat glaucous, not glandular. Leaves few, scattered chiefly on the shorter barren branches, small, lanceolate, flat, narrowed at the base; occasionally 2 or 3 attain a length of $\frac{1}{2}$ in. or more; all the rest reduced to minute distant bracts. Flowers like those of *T. pilosa*, but smaller, on very short pedicels, in the axils of minute bracts along the leafless branches. — *T. ericifolia*, var., F. Muell. Pl. Vict. i. 183.

Victoria. Woody mountain ranges at the sources of Genoa river, *F. Mueller*.

7. ***T. juncea***, *Sm. Bot. Nov. Holl. 5. t. 2.* Rootstock thick and woody, with erect or ascending slender rush-like or wiry stems, 1 to 2 ft. long, with 2 or 3 acute angles or very narrow wings, the whole breadth of the stem and wings rarely exceeding 1 line. Leaves few, small and distant, linear or lanceolate, mostly minute and scale-like, rarely 3 lines long. Pedicels in the axils of the upper minute leaves, filiform, 2 to 4 lines long. Sepals 4, small, ovate, obtuse. Petals 4, about 4 lines long. Anthers tapering into very short tubes. Ovary glabrous, with 2 superposed ovules in each cell. Capsule obovate. Seeds villous.—DC. Prod. i. 343; Reichb. Icon. Exot. t. 78.

N. S. Wales. Port Jackson, *Sieber*, n. 235, *M'Arthur*, and others.

8. ***T. affinis***, *Endl. in Huet. Enum. 7.* Glabrous, with long, winged, apparently leafless branches, at first sight closely resembling *T. juncea*, but the stems have always only 2 angles or narrow wings, the leaves are still fewer and more minute, the sepals and petals are in fives, and the anthers are minutely pubescent, and suddenly contracted into a slender tubular process as



F Mueller del. et sculp.

De Gruchy & Leigh. imp.

Tetratheca Harperi.

long as themselves or nearly so. Ovary slightly glandular, with 2 ovules in each cell. Capsule broadly ovate or obovate, shortly pointed, 3 to 5 lines long, with membranous valves. Seeds hairy.

W. Australia. King George's Sound, R. Brown, *Huegel*; Drummond, *Coll.* 1843, n. 73, and others; Gordon river, *Oldfield*.

Var. *platycantha*. Branches, including the wings, often 2 lines broad. Flowers and capsules rather larger, and 4 ovules in superposed pairs in each cell of the ovary. — Drummond, *Coll.* 1843, n. 115; Blackwood and Stirling ranges, *Oldfield*.

9. **T. nuda**, Lindl. *Swan Riv. App.* 38. Glabrous or with a few glandular hairs at the base of the stem, and sometimes on the pedicels and sepals. Rhizome woody, with numerous erect, slender, rigid but rush-like stems, cylindrical, without prominent angles, $\frac{3}{4}$ to $1\frac{1}{2}$ ft. high, often ending in an almost pungent point. Leaves very minute and distant, or a very few linear or oblong ones 2 or 3 lines long. Pedicels slender, 2 to 3 lines long. Sepals and petals 5 each. Anthers tapering into a tubular process, very short in the typical form, and of the same colour as the rest. Ovary covered with rather long glandular hairs, with 1 ovule in each cell. Capsule obovate, glandular-hairy. Seeds glabrous, smooth and shining.

W. Australia. Darling range, *Collic*, *Oldfield*; Swan River, Drummond, 1st *Coll.*, *Sanford*.

Var. *spartea*, Planch. in Herb. Hook. Tubular process of the anthers nearly as long as the cells.—Drummond, *Coll.* 1843, n. 101 and 104.

10. **T. virgata**, Steetz, in *Pl. Preiss.* i. 212. Very nearly allied to *T. nuda*, and perhaps a variety, but the branches are much more slender, often filiform, glabrous or scabrous, with a few glandular hairs: the leaves are much more frequently developed, especially on the barren branches, where however they are still few and distant, linear with revolute margins, 2 to 3 lines long; the flowers appear to be always 4-merous, and the anthers more abruptly contracted into a slender tube, usually of a paler colour, and as long as the cells. Ovary glabrous, with uniovulate cells. Capsule obovate, about 3 lines long, with smooth shining seeds.

W. Australia. Swan River, Drummond, 5th *Coll.* n. 243, *Preiss*, n. 1332, in part; Mount Barker, Kalgan and Blackwood rivers, *Oldfield*.

Var. *setigera*, Steetz, l. c. 213. Stems very scabrous, and often with reflexed bristly hairs. Leaves more numerous.—Swan River, Drummond, *Preiss*, n. 1333.

11. **T. confertifolia**, Steetz, in *Pl. Preiss.* i. 214. Stems numerous, erect and simple, or branched and diffuse or ascending, usually 6 to 9 in. long, roughly pubescent. Leaves crowded but not verticillate, linear, obtuse, 2 to 3 lines long, the margins much revolute so as to be almost terete, hispid with rigid hairs. Pedicels $\frac{3}{4}$ to nearly 1 in. long. Flowers 5-merous. Sepals lanceolate. Petals rather narrow, 4 to 5 lines long. Anthers glabrous or slightly tuberculate, tapering into a tube about as long as the cells and often of the same colour. Ovary glandular-hispid, with 1 ovule in each cell. Capsule glandular-pubescent, obovate-cuneate, about 3 lines long. Seeds glabrous.

W. Australia. Swan River, Drummond, 5th *Coll.* n. 244; Darling ranges, *Preiss*, n. 1328, 1329.

12. **T. setigera**, Endl. in *Hueg. Enum.* 8. Stems rather rigid, not much branched, usually about 1 ft. high, hispid with spreading bristly hairs, or,

when these are worn off, rough with their tubercular bases. Leaves sessile, not crowded, scattered, from ovate-lanceolate to linear-oblong, obtuse, mostly $\frac{1}{2}$ to $\frac{3}{4}$ in. long, the margins revolute, obtuse at the base, scabrous or setose on the upper side, glabrous and glaucous underneath, except a few setæ on the midrib. Pedicels very slender, 3 to 6, or rarely 7 or 8 lines long, more thickened and turbinate under the flower than in most other species. Flowers 5-merous. Sepals glabrous. Petals rather narrow, 4 to 6 lines long. Anthers glabrous, their tubular points rather shorter than the cells. Ovary glabrous, with 1-ovulate cells. Capsule usually ripening only 1 glabrous shining seed, with an unusually large strophiola.—*T. elongata*, Schuch. Syn. Trem. 38.

W. Australia. King George's Sound. *R. Brown*, and many others: Swan River, *Preiss*, n. 1322 (from a bad specimen in Herb. Sonder), *Harvey*; Blackwood and Kidgeon rivers and Bald Island, *Oldfield*.

13. **T. hispidissima**, *Steetz*, in *Pl. Preiss*, i. 217? Branches much elongated, minutely pubescent and hispid with numerous very long spreading setæ. Leaves ovate, sessile, or very shortly petiolate, obtuse, $\frac{1}{2}$ to $\frac{3}{4}$ in. long, with flat edges, hirsute with scattered hairs above, bordered with a few long setæ, softly pubescent or villous underneath. Pedicels slender, $\frac{1}{2}$ to $\frac{3}{4}$ in. long, with the turbinate summit of *T. setigera*, glabrous or with a very few setæ. Flowers of *T. setigera*. Anther-tubes slender, fully as long as the cells. Ovary pubescent with appressed hairs.

W. Australia. *Drummond*, *Coll.* 1843, n. 46; King George's Sound, *Preiss*, n. 1316.

I have not seen *Preiss*'s specimen, described by *Steetz*, and am therefore not quite confident of having correctly referred his name to *Drummond*'s plant.

14. **T. hirsuta**, *Linkl.* *Swan Riv. App.* 38, and *Bot. Reg.* 1844, t. 67. Stems rather rigid and erect, $\frac{1}{2}$ to $1\frac{1}{2}$ ft. high, minutely pubescent and often hispid with a few long spreading reddish hairs. Leaves mostly alternate, but here and there a few verticillate, from ovate-lanceolate to oblong-linear, obtuse, all under $\frac{1}{2}$ in. in the smaller specimens, nearly 1 in. long when luxuriant, the margins recurved, with an obtuse base, more or less hirsute above, villous or pubescent underneath. Pedicels slender, $\frac{3}{4}$ to 1 in. long, very slightly thickened under the calyx. Flowers rather large. Sepals lanceolate. Petals oblong. Anthers smooth or slightly rough, the tube about as long as the cells. Ovary glabrous or slightly glandular, with 1 ovule in each cell. Seeds glabrous, shining.—*Pact. Mag. Bot.* xiii. 53, with a fig.; *T. rubriseta*, *Linkl.* *Swan Riv. App.* 38; *T. epilobioides* and *T. aculeata*, *Steetz*, in *Pl. Preiss*, i. 218.

W. Australia. Swan River, *Drummond*, and many others; Harvey river, *Oldfield*, a variety with smaller flowers, apparently white, with a purple spot at the base, and shorter anthers.

15. **T. viminea**, *Linkl.* *Swan Riv. App.* 38. Stems rather slender, erect, little branched except at the base, sometimes only 6 in., but usually 1 to $1\frac{1}{2}$ ft. high, glabrous or with a few long spreading setæ, rarely mixed with a few short hairs. Leaves on the main stems usually ovate obovate or orbicular, 3 to 5 lines long, rather thin, nearly flat, glabrous or ciliate, or very rarely hirsute above, glabrous underneath, those of the side branches or the upper

floral ones often narrow-lanceolate and much revolute, all in whorls of 3 or 4, or very rarely the upper ones alternate. Pedicels slender, about $\frac{3}{4}$ in. long. Flowers 5-merous. Sepals ovate-lanceolate. Petals rather narrow. Anthers purple, short and scabrous, abruptly contracted into a tube as long as the cells. Ovary glabrous or slightly glandular, with 1 ovule in each cell. Capsule obovate. Seeds smooth and shining. — *T. gracilis*, Steetz, in Pl. Preiss. i. 215 (founded on slender side branches).

W. Australia. Swan River, *Drummond*, 1st Coll. and 1843, n. 108, Preiss, n. 1327 and 1335; Harvey, Preston, Blackwood, and Vasse rivers, *Oldfield*.

16. ***T. pubescens***, Turcz. in Bull. Mosc. 1852, ii. 141. Very nearly allied to *T. viminea*, and perhaps a variety only, but the slender rigid branches as well as the upper side of the leaves are often rough with a minute pubescence and the long spreading setæ very rare, the leaves, from ovate to lanceolate, are thicker and almost coriaceous, and often marked on each side with 1 or 2 coarse teeth. Pedicels shorter and not so slender. Sepals ovate, obtuse, rarely above 1 line long. Anthers more gradually attenuated into a shorter tube. — *T. tenuiramea*, Turcz. in Bull. Mosc. 1852, ii. 142.

W. Australia. Swan River, *Drummond*, 1845, n. 245 and 209. The latter specimens distinguished by Turczaninow under the name of *T. tenuiramea*, only differ in their branches rather more slender.

17. ***T. pilifera***, Lindl. in Swan Riv. App. 38. Allied to *T. viminea*, but usually smaller and more branched, and readily distinguished by the anthers. Stems 6 in. to 1 ft. high, slender, and more or less pubescent or hirsute with stiff hairs, but with few of the long setæ except at the nodes, and sometimes almost glabrous. Leaves in whorls of 3 or 4, from ovate to ovate-lanceolate, 2 to 5 lines long, often toothed, glabrous or roughly pubescent on the upper side, with a few hairs on the midrib underneath. Pedicels $\frac{1}{2}$ to $\frac{3}{4}$ in. long. Flowers rather smaller than in *T. viminea*, usually 5-merous, but occasionally 4-merous. Sepals ovate or almost lanceolate. Filaments, although short, very slender. Anthers pale-coloured, nearly straight, scarcely furrowed, slightly tapering into a very short tube. Ovary slightly glandular, with 1 ovule in each cell. Seeds smooth and shining. — *T. Preissiana*, Steetz, in Pl. Preiss. i. 219; *T. micrantha*, Schuch. Syn. Trem. 43 (from the character given).

W. Australia. Swan River, *Drummond*, 1st Coll. and 1843, n. 103, Preiss, n. 1323; Darling range, *Collic.* I have not seen Preiss's n. 1324 from which *T. micrantha* was described.

18. ***T. filiformis***, Benth. Branches in our specimens very long and slender, glabrous or bearing above the internodes a few short spreading purple hairs. Leaves opposite or occasionally in whorls of 3, very rarely 4, narrow-lanceolate or oblong-linear, $\frac{1}{2}$ to $\frac{3}{4}$ in. long, thinner than in most species, flat, obtuse at the base, glabrous. Pedicels very slender, more than 1 in. long. Sepals ovate-lanceolate, about 1 line. Petals obovate-oblong, 4 to 5 lines. Anthers dark purple, short, much curved, very angular, with a straight tube as long as the cells. Ovary glabrous or slightly glandular, with 1 ovule in each cell.

W. Australia. Swan River, *Drummond*, Coll. 1843, n. 197 and 181. Franklin river, *Herb. Muell.*

2. PLATYTHERA, Steetz.

Stamens in 2 distinct series, the anthers continuous with the filament; with 4 parallel cells in a single plane, contracted into a tube at the top. Disk none. Capsule opening loculicidally at the edge, with the valves splitting septically. Seeds glabrous, without appendage. A heath-like shrub, with verticillate leaves.

1. *P. galioides*, Steetz, in *Pl. Preiss.* i. 220. An erect heath-like shrub or undershrub, with slender terete branches, sometimes quite glabrous, but more frequently with a little tuft of hairs at each node, and often pubescent below the nodes. Leaves usually about 8 in a whorl, narrow-linear, sometimes very acute and pungent, sometimes almost obtuse or with slightly recurved points, about $\frac{1}{2}$ in. long, with the margins often revolute so as to be almost terete or 3-angled, glabrous or rough, with a few scattered short rigid hairs. Pedicels slender, $\frac{3}{4}$ to 1 in. long. Sepals narrow-lanceolate, acute, 3 to 4 lines long. Petals nearly $\frac{1}{2}$ in., blue with a dark spot at the base. Anthers short and broad, with long slender tubes. Ovary glabrous, with 2 superposed ovules in each cell. Capsule about 3 lines long.—*P. crucianella*, Steetz, l. c. 221; *P. crassifolia*, Steetz, l. c. 222; *Tetralthea verticillata*, Paxt. Mag. Bot. xiii. 171, with a fig.; *Tremandra verticillata*, Hueg. in Walp. Ann. i. 76 (the fig. quoted from Parad. Vind. is not yet published).

W. Australia. Swan River, *Drummond*, Coll. 1843, n. 102, *Preiss.* n. 1320, 1330, 1331 (also 1321, which I have not seen); Preston, Kalbar, and Vasse rivers, *Oldfield*.

3. TREMANDRA, R. Br.

Stamens apparently in a single series, the anthers articulate on the short filiform filaments, 2-celled, not attenuated into a tube, although opening by a single terminal pore in 2 short valves. Disk crenate, almost 5-lobed, between the petals and stamens. Capsule opening at the edges. Seeds with an appendage or strophiole at the chalazal end. Shrubs with stellate hairs or tomentum. Leaves opposite, toothed.

Densely tomentose. Leaves 1 in. or more. Pedicels shorter than the leaves

1. *T. stelligera*.

Slender, with minute scattered stellate hairs. Leaves under $\frac{1}{2}$ in. Pedicels longer, filiform

2. *T. diffusa*.

1. *T. stelligera*, R. Br. in *DC. Prod.* i. 344. A shrub of 2 ft. or more, densely clothed with stellate hairs sometimes short and tomentose or almost floccose, sometimes long and hirsute. Leaves opposite, shortly petiole, ovate, obtuse, 1 to $1\frac{1}{2}$ in. long, coarsely and irregularly toothed or rarely entire. Pedicels shorter than the leaves. Sepals lanceolate, tomentose or villous, 2 to 3 lines long. Petals but little longer. Anthers rather longer than their filaments, dark-purple, hirsute pubescent or glabrous, truncate or oblique at the top. Ovary densely pubescent, with 2 superposed ovules in each cell. Capsule broadly ovate, pubescent. Seeds more or less silky-pubescent, with a large hooked appendage at the chalazal end. — *T. oppositifolia*, Steetz, in *Pl. Preiss.* i. 222.

W. Australia. King George's Sound, *R. Brown*, and many others.

Var. *hispidula*. Branches and leaves rigidly hirsute. Anthers glabrous. Capsule narrower than in the normal form, with smaller seeds, and a shorter appendage, *Drummond* l, n. 161, 194 and 217, *Coll.* 1843.

2. **T. diffusa**, *R. Br. in DC. Prod.* i. 344. Slender and diffuse, the branches often filiform and spreading to 1 or 1½ ft., glabrous or minutely pubescent. Leaves petiolate, broadly ovate, 3 to 5 lines long, more or less toothed, glabrous above, rough underneath, with very short scattered stellate hairs. Pedicels filiform, often longer than the leaves, although sometimes short. Sepals about 1 line. Petals 1½ lines long. Anthers pale, almost glabrous, not longer than the filaments. Ovary villous or pubescent, with 2 superposed ovules in each cell. Capsule broader than long, didymous, pubescent. Seeds silky-pubescent, with a short straight appendage at the chalazal end.

W. Australia. Rocky hills, King George's Sound, *R. Brown, Drummond*, n. 216, *Oldfield*.

ORDER XIV. POLYGALEÆ.

Flowers hermaphrodite, irregular. Sepals 5, free, much imbricate, the 2 inner ones usually larger and petal-like. Petals 3 or 5, rarely all free, most frequently 2 or 4 in pairs united at the base with the lower concave or helmet-shaped petal or keel and often with the staminal tube. Stamens 8, rarely 5 or 4, usually united to above the middle in a sheath open on the upper side. Anthers erect, 1- or 2-celled, usually opening by a single terminal or oblique pore. Torus small, or rarely expanded into a disk within the stamens. Ovary free, 2-celled or rarely 1-celled, or in a few flowers 3- to 5-celled. Style simple, usually curved at the top, with a variously shaped entire or 2-lobed stigma. Ovules usually solitary in each cell, pendulous, anatropous with a ventral raphe. Seeds pendulous, the crustaceous testa often hairy, and bearing a caruncle at the hilum or at the opposite end. Albumen fleshy or rarely deficient. Embryo straight, with flat, convex, or rarely thick and fleshy cotyledons.—Herbs, undershrubs, or small shrubs, rarely (in genera or species not Australian) tall shrubs, climbers or trees, glabrous or hairy, but without stellate hairs. Leaves usually alternate and entire, without stipules, very rarely opposite. Flowers solitary or in spikes or racemes, rarely paniculate, the pedicels usually articulate at the base, with a subtending bract, and 2 bracteoles.

A considerable Order, widely dispersed over nearly the whole globe. Of the three Australian genera, one is the largest and most extensively diffused of the whole Order, here represented by a very few species of an Asiatic or African type; another is Asiatic, of which one species extends to Australia; the third is endemic.

Sepals nearly equal. Anthers 4 or 5. Flowers minute, in terminal spikes 1. SALOMONIA.

Inner sepals larger and petal-like. Anthers 8.

Capsule ovate or orbicular, scarcely contracted at the base. Seeds not comose.

Lateral petals united with the carina (which is always crested in the Australian species) 2. POLYGALA.

Lateral petals adnate to the staminal column, but distinct from the carina, which is not crested 3. COMESPERMA.

Capsule cuneate, very narrow at the base. Seed hairs forming a long coma 3. COMESPERMA.

1. SALOMONIA, Lour.

Sepals nearly equal, the 2 innermost rather larger. Petals 3, united in a single corolla open on the upper side, the keel not crested. Stamens united nearly to the top into a sheath open on the upper side, and adhering to the corolla at the base; anthers 4 or 5. Ovary 2-celled. Capsule thin, flat, obcordate or transversely oblong, usually ciliate, opening loculicidally at the edges. Seeds orbicular, with a minute or without any caruncle.—Small slender herbs, either annual or parasitical on roots. Leaves alternate, sometimes reduced to minute scales. Flowers very small, in terminal spikes.

The few species known are all natives of tropical Asia, the most common one extending into tropical Australia; but none have yet been found in Africa.

1. *S. oblongifolia*, DC. *Prod.* i. 334. A slender glabrous annual, erect and simple, or slightly branched at the base, 3 to 5, or rarely 6 in. high. Leaves sessile, the larger ones oblong, 3 to 4 lines long, and scarcely above 1 broad, the lower ones small and ovate. Flowers pink, scarcely a line long, in terminal leafless racemes or loose spikes of about an inch or rarely longer. Capsule about 1 line broad, but not so long, flattened, didymous, bordered with a fringe of hairs or slender teeth.—Deless. *fc. Sel.* iii. t. 19; *S. obovata*, Wight, *Illustr.* t. 22.

Queensland. Endeavour river, *R. Brown* (*Hb. R. Br.*). Common in the warmer districts of India, from Ceylon and the Peninsula to the Archipelago and the Philippine Islands.

2. POLYGALA, Linn.

Sepals unequal, the 2 innermost, or wings, large and petal-like. Petals 3, united in a single corolla open on the upper side, the keel bearing a crest-like appendage on the back near the top, or rarely (in species not Australian) 3-lobed. Stamens 8, united to above the middle in a sheath open on the upper side, and adnate to the petals at the base. Ovary 2-celled. Style various. Capsule thin or rarely coriaceous, flattened, obovate, ovate, or orbicular, usually notched at the top, opening loculicidally at the edges. Seeds ovate or oblong, hairy or glabrous, but the hairs not lengthened into a coma, with or without a caruncle at the hilum.—Herbs, undershrubs, or shrubs. Leaves usually alternate or whorled. Racemes or spikes terminal or lateral, rarely axillary.

A very large genus, abundant in tropical countries, and generally also in temperate regions, except in Australia, where it is, with one exception, limited to the tropical districts, and in New Zealand, where it is entirely absent. Of the 7 Australian species, 3 are widely spread over tropical Asia, and the 4 others, although endemic, are nearly connected also with corresponding Asiatic ones.

- Perennial. Style with 2 stigmatic lobes one above the other. Seeds obovate, shortly villous 1. *P. japonica*.
- Annuals. Seeds oblong villous, the hairs much longer at the end furthest from the hilum.
- Racemes long, terminal. Inner sepals petaloid, obtuse. Crest fringed. Stigma simple, terminal, capitate 2. *P. leptalea*.
- Racemes short, very dense and hirsute, terminal or lateral. Inner sepals herbaceous, acuminate. Crest 2-horned. Style with 1 erect lobe and a lower large glandular stigma 3. *P. eriocephala*.

Racemes lateral. Inner sepals herbaceous, mucronate, usually falcate. Crest fringed. Style with 1 large hooked or reflexed stigmatic lobe.

Racemes shorter than the leaves, or if longer, very dense.

Leaves orbicular 5. *P. orbicularis*.

Leaves from obovate to linear.

Capsules broadly winged and ciliate 4. *P. rhinanthoides*.

Capsules wingless and glabrous or nearly so 6. *P. arvensis*.

Racemes slender, much longer than the leaves 7. *P. stenoclada*.

1. **P. japonica**, *Houtt. Syst. 8, t. 62, f. 1, according to DC. Prod. i. 324.* Rootstock perennial, often woody with age, emitting numerous rather slender leafy stems, decumbent or erect, rarely more than 6 in. long, more or less pubescent. Leaves nearly sessile, the lower ones ovate, obtuse and small, the upper ones elliptical or lanceolate, acute, $\frac{1}{2}$ to $\frac{7}{8}$ or rarely 1 in. long, of a rather firm consistence, glabrous and almost shining, distinctly veined. Racemes lateral, sometimes of 2 or 3 flowers only, and shorter than the leaves, sometimes 6- to 8-flowered and longer. Bracts small and deciduous, but less so than in most species. Outer sepals narrow-lanceolate; inner ones ovate, obtuse, 2 to 3 lines long and not oblique. Keel-petal crested. Ovary glabrous. Style thickened, incurved, with 2 unequal stigmatic lobes, the upper one arching over the lower short one. Capsule about 3 lines long and broad, including the rather broad wing. Seeds obovate, slightly pubescent, with a 3-lobed caruncle.—*P. veronica*, *F. Muell. Pl. Viet. i. 184.*

Queensland. Dawson and Brisbane rivers, *F. Mueller*.

N. S. Wales. Botany Bay, *R. Brown*; Paramatta to the Blue Mountains, and shaded situations near Bathurst, *A. Cunningham*; Port Stephens, *Lachy Parry*; Hastings and Macleay rivers, *Beckler*; New England, *C. Stuart*.

Victoria. Grassy or gravelly places on the Goulburn and Ovens rivers and their lower tributaries, *F. Mueller*.

Also in the hilly regions of tropical Asia and northward to Japan. I can, indeed, find no difference between the Australian and the Japanese specimens, except that the flowers in the latter are rather larger: but several Khisia specimens are precisely like the Australian ones. *P. elegans*, *Wall.*, from East India and China, differs slightly in the racemes most frequently terminal with numerous flowers.

2. **P. leptalea**, *DC. Prod. i. 325.* An erect, glabrous, slender annual, simple or slightly branched, usually 1 to $1\frac{1}{2}$ ft. high. Leaves few, linear, the longer ones about 1 in., the uppermost much smaller, and the lower ones sometimes shortly oblong. Flowers small, numerous, pendulous, in a 1-sided terminal raceme, on pedicels which rarely attain 1 line. Outer sepals narrow-oblong, obtuse, the lowest rather larger and concave: inner sepals nearly twice as large, petal-like, broadly oblong, obtuse, 2 to $2\frac{1}{2}$ lines long. Keel-petal crested. Style scarcely thickened, much curved, inflexed at the summit with an entire capitate stigma. Capsule broadly oblong, rather shorter than the inner sepals, with a narrow transparent wing. Seeds hirsute with reflexed hairs, the caruncle very small.—*P. oligophylla*, *DC. Prod. i. 325.*

N. Australia. Upper Victoria river, *F. Mueller*; Port Essington, *Armstrong*.

Queensland. Endeavour river, *R. Brown*.

Frequent in northern and eastern India.

3. **P. eriocephala**, *F. Muell. Herb.* A more or less pubescent annual, in our specimens little branched and not exceeding 6 in. Leaves linear or

oblong-linear, some exceeding $1\frac{1}{2}$ in. Racemes lateral or terminal, very dense and ovoid or oblong, $\frac{1}{2}$ to 1 in. long, and very villous, the flowers nearly sessile. Outer sepals small and almost setaceous; inner sepals obliquely ovate, acuminate, about 2 lines long when in flower, nearly 4 when in fruit, herbaceous and hirsute with slender spreading hairs, completely enclosing the very fugacious corolla. Keel-petal very much shorter than the side ones, the dorsal crest consisting of 2 long simple horns. Style not thickened, 2-lobed, the upper lobe shortly filiform and incurved, the lower one expanded into a large stigmatic gland. Ovary covered with very long hairs. Capsule orbicular, emarginate, not winged, 2 to nearly 3 lines long, hirsute with long fine hairs. Seeds oblong, with reflexed hairs.

N. Australia. Upper Victoria river, *F. Mueller*.

4. ***P. rhinanthoides*, Soland. in Herb. R. Br.** An erect branching slightly pubescent annual, from an inch or two to above a foot high. Leaves oblong-linear, or rarely obovate-oblong, obtuse or rarely acute, $\frac{3}{4}$ to $1\frac{1}{2}$ in. long, glabrous or ciliate, narrowed into a short petiole. Racemes lateral, short, rather dense, 6- to 10-flowered. Outer sepals lanceolate, with a fine point; inner sepals broadly ovate, oblique, mucronate, ciliate, 2 to 3 lines long. Keel-petal crested. Ovary broad, ciliate. Style slightly thickened, much curved, entire, with a broad almost petaloid decurved stigma, bearded underneath. Capsule 4 lines long and broad, including a broad wing, pubescent and ciliate. Seeds oblong, hirsute with reflexed hairs, the caruncle deeply 3-lobed.

N. Australia. Upper Victoria river, *F. Mueller*.

Queensland. Endeavour river, *R. Brown*.

Var. *minor*. A smaller and more glabrous plant, with narrower leaves, looser racemes, and more glabrous; capsules with narrower wings, almost connecting the species with some forms of *P. arvensis*. Upper Victoria river, *F. Mueller*.

5. ***P. orbicularis*, Benth.** An annual of 3 to 6 in., branching at the base only, glabrous or very slightly pubescent. Leaves distinctly petiolate, very broadly obovate or orbicular, or even broader than long, $\frac{3}{4}$ to 1 in. diameter, or the lower ones smaller. Racemes usually terminal, dense, $\frac{1}{2}$ to 1 in. long. Outer sepals very small and lanceolate; inner sepals obliquely ovate, rounded, with a short point, glabrous, about $2\frac{1}{2}$ lines long. Corolla fully as long, the lateral petals unusually large, the crest fringed. Style not thickened, with an almost petaloid uncinately-decurved stigma, glabrous, or slightly bearded underneath. Capsule orbicular, $2\frac{1}{2}$ lines long, scarcely winged. Seeds hairy, the caruncle 3-lobed.

N. Australia. South Goulburn Island, *A. Cunningham*; Melville Island, *Fraser*; N. coast, *Armstrong*.

Allied to the var. *obovata* of *P. arvensis*, but appears to me, as far as hitherto known, too distinct in habit and foliage to be united with that species.

6. ***P. arvensis*, Willd. Spec. Pl. iii. 876.** A procumbent or rarely erect annual, branching at the base only, sometimes not exceeding a couple of inches when in full fruit, sometimes the prostrate or ascending branches extending to 6 or 8 in. or even more, and usually pubescent. Leaves from obovate to oblong or linear, $\frac{1}{2}$ to $\frac{3}{4}$ in. long or rarely more. Flowers few, in short sessile racemes, usually lateral, often shorter than the leaves, and rarely



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lengthening to an inch. Outer sepals very small and narrow; inner sepals ovate-falcate, acute or mucronate, 2 to 3 lines long, herbaceous and glabrous or slightly pubescent. Corolla about as long, the lateral petals rather large, the crest of the keel fringed. Ovary glabrous. Style scarcely thickened, with an almost petaloid uncinately-decurved stigma, glabrous and glandular underneath. Capsule rather broad, glabrous or slightly pubescent, not winged. Seeds very hairy.—DC. Prod. i. 326.

N. Australia. Upper Victoria river, *F. Mueller*; Goulburn Island, *A. Cunningham*; N. coast, *R. Brown*.

Queensland. Endeavour river, *R. Brown*.

A very common East Indian weed, variable in foliage and stature; the following forms appearing sometimes constant enough to be considered as distinct species:—

Var. *obovata*. Leaves all obovate, giving the plant the aspect of a young *Euphorbia helioscopia*. Cavern Island, Carpentaria, *R. Brown*.

Var. *squarrosa*. Leaves narrow. Flowers small and numerous, in oblong racemes, mostly terminal, the inner sepals narrow and falcate. *P. squarrosa*, Soland. ms. Endeavour river, *R. Brown*; Upper Victoria river, *F. Mueller*.

Var. *stenosepala*. Leaves narrow-linear. Racemes short and few-flowered, or flowers almost solitary. Inner sepals narrow and less falcate. Capsule not above half as broad as long. Victoria river, *F. Mueller*; and nearly the same form, but with more flowers, Arnhem Bays, *R. Brown*.

7. ***P. stenoclada*, Benth.** A slender, glabrous, erect annual, simple or little branched. Leaves distant, very narrow-linear, almost terete, obtuse or minutely pointed, $\frac{1}{2}$ to 1 in. long. Peduncles lateral, slender, elongated, bearing towards the top a slender raceme of small blue flowers on very short pedicels. Outer sepals lanceolate, very acute with scarious margins; inner sepals about 2 lines long, broadly ovate-lanceolate and falcate with a dark-coloured point. Keel-petal crested. Ovary glabrous. Style slender, much curved, with an almost petaloid deflexed blue stigma, bearded on the under side.

N. Australia. Upper Victoria river, *F. Mueller*.

The inflorescence is that of some specimens of the East Indian *P. Wightiana*, but besides the difference in foliage, the flowers are much smaller and narrower, and approach much more in structure the *P. arvensis*, from which *P. stenoclada* differs chiefly in inflorescence, and, in the above described specimens, in its very narrow leaves.

Var. (?) *stenosepala*. Rather taller and more branched. Leaves oblong or linear, flat, $\frac{1}{2}$ to 1 in. long. Flowers in a loose pedunculate raceme, much longer than the leaves, as in *P. stenoclada*; but the inner sepals are narrow, pointed, and much falcate, as in the var. *stenosepala* of *P. arvensis*.—Carpentaria Point and Arnhem Bays, *R. Brown* (Hb. R. Br.).

3. COMESPERMA, Labill.

Sepals unequal, the 2 innermost, or wings, large and petal-like. Petals 3, the keel not crested, the two lateral ones separately attached to the staminal column, and either overlapped by the keel or outside it at the top. Stamens 5, united to above the middle in a sheath, open on the upper side and adnate to the petals at the base. Ovary 2-celled. Style incurved, obliquely stigmatic and more or less 2-lobed at the top. Capsule coriaceous or almost membranous, usually cuneate and much narrowed at the base, rarely nearly orbicular, opening loculicidally at the edges. Seeds ovate or oblong, pendulous, pubescent or hairy, the hairs lengthening into a coma whenever the cap-

sule is narrowed at the base, without any caruncle at the hilum, but the raphe often expanded into a caruncular appendage at the opposite end.—Herbs undershrubs or shrubs, erect or twining. Leaves alternate, usually small. Racemes terminal.

A strictly Australian genus, with which was formerly united the Brazilian *Brodiaenea* (*Crotocoma*, Benth.); but, besides the difference in habit, the latter has a more or less fleshy capsule, and the seeds have a long coma proceeding from the hilum; whilst in *Comesperma*, the coma, when present, consists of the hairs of the testa, which always extend to the base of the capsule, although the seed is often not half so long. In 2 species the capsule is that of a *Polygala*, and the seeds have no coma; but in those the insertion of the lateral petals, very different from that of *Polygala* and approaching that of *Mouningia*, is strongly marked. In *P. volubilis* (which was chiefly taken into account in verifying the characters for our 'Genera Plantarum'), the arrangement of the petals is nearer to that of *Polygala*, but there the carpological characters are very decided. Besides that, the genus *Comesperma* is so natural a one, that it is never liable to be confounded with any of those allied to it in structure. The precise arrangement of the petals in the smaller-flowered species, very difficult to ascertain in dried specimens, requires verification from the living plant.

Capsule sessile. Seeds filling the cells, without a coma. Stems leafless. (Sect. **Prosthemosperma**, F. Muell.)

Capsule orbicular. Flowers in a short terminal raceme 1. *C. sphærocarpum*.

Capsule obovate or cuneate. Flowers distant.

Branches erect, rigid, broom-like. Seed with a broad terminal membrane 2. *C. scoparium*.

Branches very slender, divaricate, intricately branched. Seed with a long terminal appendage 3. *C. aphyllum*.

Branches divaricate, thorny. Seeds without any appendage 4. *C. spinosum*.

Capsule narrowed into a stipes, containing the long coma of the seeds, which only occupy the broad part of the cells.

Outer sepals all free, much shorter than the wings.

Branches twining or very short and almost leafless.

Leaves few, mostly obtuse. Capsule not winged.

Flowers blue or white. Pedicels glabrous 5. *C. volubile*.

Flowers yellow. Pedicels pubescent 7. *C. integerrimum*.

Leaves very few and small, acute, ciliate. Bracts ciliate. Capsule winged. Flowers blue 6. *C. ciliatum*.

Stems erect, leafy.

Leaves flat, ovate or oblong.

Pubescent.

Leaves small, broadly ovate, mucronate, crowded. Flowers

1 to 1½ lines 8. *C. secundum*.

Leaves thick, oblong, obtuse 9. *C. Drummondii*.

Glabrous.

Leaves mucronate, very glaucous 11. *C. sylvestre*.

Leaves obtuse, green 10. *C. retusum*.

Leaves linear.

Leaves pungent, strongly keeled. Keel-petal horned 12. *C. acerosum*.

Leaves with revolute margins. Keel-petal not horned 13. *C. ericinum*.

Leaves very narrow, almost terete.

Racemes elongated. Bracts comose. Flowers blue 14. *C. confertum*.

Racemes corymbose or conical. Bracts very minute.

Flowers yellow 15. *C. flavum*.

Outer sepals all free, nearly as long as the wings. (Sect. **Isocalyx**, Steetz.)

Stems leafy.

Capsule narrowed into a long stipes 16. *C. calymega*.

Capsule elliptical or oblanceolate, shortly narrowed at the base 17. *C. lanceolatum*.

- Stems very slender, almost leafless. 18. *C. defoliatum*.
 Two of the outer sepals connate. (Sect. **Disepalum**, Steetz.)
 Flowers small, the wings not twice as long as the outer sepals.
 Leaves few, small, distant. 19. *C. nudiusculum*.
 Wings 3 or 4 times as long as the outer sepals. Leaves linear.
 Leaves strongly keeled. Keel-petal horned. Seeds with a
 membrane at the end furthest from the hilum. 20. *C. virgatum*.
 Leaves flat, not keeled. Keel-petal not horned. Seeds with-
 out any appendage. 21. *C. polygaloides*.

1. **C. sphærocarpum**, Steetz, in *Pl. Preiss.* ii. 314. Rootstock woody but not thick, with slender, broom-like, or flexuose stems, sometimes perhaps slightly twining, $\frac{1}{2}$ to $1\frac{1}{2}$ ft. long, glabrous and slightly sulcate. Leaves reduced to minute distant scales, or the lower ones rarely 2 lines long, and linear. Flowers 3 to 6, in a short loose terminal raceme, on pedicels of 1 to 2 lines, the bracts very minute and deciduous. Outer sepals oblong, rather acute, almost scarious, about half the length of the inner ones, which are broadly obovate, blue and petal-like, 2 to nearly 3 lines long. Corolla and style of *C. scoparium*. Capsule nearly orbicular, about 2 lines diameter, slightly cuneate at the base or at length quite obtuse, glabrous. Seeds ovate, shortly pubescent, with a short membranous hairy appendage at the lower or chalazal end.

N. S. Wales. Hunter's River and Port Jackson, *R. Brown*; Mount Tomah, *R. Cunningham*; Paramatta, *Woolfs*; Hastings river, *Beckler*.

2. **C. scoparium**, Steetz, in *Pl. Preiss.* ii. 309. Stems woody at the base, with numerous erect, rigid, broom-like, sulcate branches, 1 to 2 ft. high, glabrous. Leaves all reduced to minute distant scales. Flowers blue, singly scattered along the smaller branches on exceedingly short, thickened pedicels, surrounded by several minute, scale-like, obtuse, imbricate bracts. Outer sepals rather rigid, obovate-oblong, more than half the length of the inner ones, the lowest the smallest. Inner sepals petal-like, very broadly obovate, about 2 lines long; keel-petal about as long, the 2 lateral lobes broad and short; lateral petals shorter, narrow, free almost from the base, overlapping the keel. Ovary glabrous. Style not winged. Capsule sessile, cuneate-oblong, about 3 lines long, with a thickened margin. Seeds slightly pubescent, with a hairy membrane at the chalazal end, often more than half the length of the seed, and continuous with the prominent raphe. *F. Muell. Pl. Viet.* i. 186.

N. S. Wales. Desert of the Darling, near Fitzgerald ranges, *F. Mueller*.

Victoria. Sandy desert, near the Murray, *Dallachy*.

W. Australia. Swan River, where it is known as the 'Swan-river Broom,' *Drummond*; Murchison river, *Oldfield*; Fitzgerald ranges, *Maxwell*.

3. **C. aphyllum**, *R. Br. Herb.* Tall, erect, and leafless, with very numerous slender, almost filiform, although rigid, divaricate branches, slightly sulcate, not thorny, and quite glabrous. Leaves all reduced to very minute distant scales. Flowers few and very small, singly scattered along the smaller branches. Outer sepals small and free; inner sepals scarcely above 1 line long and petals scarcely longer. Capsule sessile, obovate, about 2 lines long. Seeds without long hairs, but with a membranous appendage at the lower or chalazal end, more than half as long as the seed.

N. Australia. Islands of the N. coast, *R. Brown* (*Herb. R. Br.*).

4. ***C. spinosum***, *F. Muell. Fragm.* i. 144. A rigid, much branched, glabrous, leafless shrub, the branches scarcely sulcate, the smaller ones ending in rigid thorns. Leaves all reduced to minute subulate scales. Flowers few, scattered singly on the short branches. Outer sepals free, broad, rigid, not 1 line long; inner sepals broad, about 2 lines. Petals rather longer, lateral lobes of the keel-petal short and broad, lateral petals as long or rather longer. Capsule narrow-obovate, about 3 lines long, shortly acuminate, contracted below the middle, but scarcely stipitate. Seeds (which I have not seen) shortly and densely villous, without any appendage.

W. Australia. Sandy tracts, Fitzroy's ranges, and West Mount Barren, *Macrell*.

5. ***C. volubile***, *Labill. Pl. Nov. Holl.* ii. 24, t. 163. A glabrous twiner, with numerous branches, sometimes extending to a considerable length, rarely short and flexuose, or almost erect. Leaves few, the lower ones oblong-linear or lanceolate, sometimes above an inch long and narrowed into a petiole, the upper ones linear or rarely obovate, small and distant. Racemes axillary or terminal, loose, 1 or rarely 2 in. long, sometimes 2 or 3 together. Flowers blue or rarely white, on pedicels of 1 to 2 lines. Outer sepals very broad, obtuse, about 1 line long; inner sepals fully 3 lines long, nearly orbicular, distinctly clawed. Keel-petal with 2 oblong lateral lobes turned inwards in aestivation and overlapped, at least at the top, by the 2 large, obovate, lateral petals. Style dilated upwards, but not winged. Capsule 4 to nearly 5 lines long, rounded, truncate and often slightly acuminate at the top, nearly 1½ lines broad, and gradually narrowed into a rather broad stipes. Seeds oblong, the long hairs forming the coma much fewer on the sides than on the edges. — DC. Prod. i. 334; Hook. f. Fl. Tasm. i. 31; F. Muell. Pl. Viet. i. 191; *C. tortuosum*, Steetz, in Pl. Preiss. ii. 303; *C. gracile*, Paxt. Mag. v. 145, with a fig.

N. S. Wales. Port Jackson to the Blue Mountains, *R. Brown, Seeb.* n. 366, and others; Twofold Bay, *F. Mueller*.

Victoria. Forest and scrub country, widely distributed over the colony, *F. Mueller*.

Tasmania. *R. Brown*; throughout the island, abundant in light soils, climbing over bushes, etc., a most beautiful plant, well known as the 'Blue Creeper,' *J. D. Hooker*.

S. Australia. *Whittaker*; Spencer's Gulf, *Wacharton*; Quichen Bay, *F. Mueller*.

W. Australia. King George's Sound, *R. Brown, Fraser*; Swan River, *Drummond, Coll.* 1843, n. 185. Some of these specimens, probably after having been eaten down, have short, flexuose, or almost erect stems.

C. pauciflorum, Turcz. in Bull. Mosc. 1854, ii. 352, from W. Australia, *Gillert*, n. 86, would appear from the character given to be very near *C. volubile* and *C. ciliatum*, but is said to have a shrubby, erect, much-branched stem. It is possible that the idea may have been suggested by stunted specimens of *C. volubile*, such as those above alluded to.

6. ***C. ciliatum***, *Steetz, in Pl. Preiss.* ii. 304. Very near *C. volubile*, with similar glabrous, twining, sulcate branches. Leaves still fewer, very small, rigid and acute, usually ciliate with stiff hairs. Bracts linear-subulate, also ciliate. Flowers blue or pink, rather smaller than in *C. volubile*, much more numerous, in rather dense terminal racemes of 2 to 3 in. Outer sepals ovate-oblong, obtuse or almost acute, above 1 line long; inner sepals and petals like those of *C. volubile*, but much smaller. Capsules on long pedicels,

like those of *C. volubile*, but rather broader, owing to a membranous wing which borders them more or less, especially towards the summit.

W. Australia. Swan River, *Drummond*; Geographer Bay, King river, and Blackwood river, *Oldfield*.

7. ***C. integerrimum*, Endl. in Hueg. Enum. 7.** Very near *C. volubile*, with similar twining sulcate branches and few oblong-linear or lanceolate leaves, but the young shoots racemes and pedicels are usually minutely hoary-pubescent, the racemes are denser, with shorter and firmer pedicels, and the flowers yellow and rather smaller. Outer sepals broad and obtuse as in *C. volubile*. Petals similarly shaped, except that the lateral lobes of the keel are rather deeper, but I have in vain sought for the small additional petals described by Steetz. Capsule 8 to 9 lines long, $1\frac{1}{2}$ lines broad at the top, with a very prominent obtuse acumen, gradually narrowed into a stipes at the base. Seed 4 to 5 lines long, tapering almost to a point, otherwise nearly terete, the hairs of the coma proceeding from all over the surface.—Steetz, in Pl. Preiss. ii. 305; *C. scandens*, Steud. in Pl. Preiss. i. 211.

W. Australia. Rottenest Island, *A. Cunningham*; Swan River, *Drummond*, Coll. 1843, n. 486; near Mount Desmond, *Herb. F. Mueller*.

8. ***C. secundum*, Banks, in DC. Prod. i. 334.** A low, much-branched, rigid shrub, with the habit of some *Epacridæ*, the branches softly pubescent. Leaves crowded, spreading, ovate, mucronate, 2 to 3 lines long, rigidly coriaceous, rough with minute tubercular hairs. Flowers very small and numerous, in slender one-sided racemes of 1 to 2 in., on very short pedicels. Outer sepals short, very broad and obtuse; inner sepals nearly three times as long, although scarcely exceeding 1 line, apparently pink. Keel-petal very broad, overlapping the narrow lateral ones. Style not winged. Capsule fully $\frac{1}{2}$ in. long, truncate, 3-toothed, and scarcely 1 line broad at the top, tapering into a slender stipes twice as long as the oblong part. Seed elongated, without any appendage, the long coma apparently very deciduous, but not seen quite ripe.

N. Australia. Islands of the north coast, *R. Brown*.

Queensland. Endeavour river, *R. Brown*; Cape Flinders, *A. Cunningham*.

9. ***C. Drummondii*, Steetz, in Pl. Preiss. ii. 301.** Shrubby, with short rigid branches, and all over glaucous, with a minute pubescence only visible under a lens. Leaves narrow-oblong, mostly obtuse, 3 to 4 lines long, very thick and rather concave, the midrib rarely conspicuous. Racemes many-flowered, short and almost corymbose, although the pedicels are rather long. Flowers of *C. retusum*. Capsule, according to F. Mueller, narrower, with a shorter stipes.

W. Australia, *Drummond*; Stirling ranges to West Mount Barren, *Maxwell*.

10. ***C. retusum*, Labill. Pl. Nov. Holl. ii. 22, t. 160.** Glabrous, erect, shrubby and much-branched, often several feet high, the branches mostly erect and not sulcate. Leaves oblong, obtuse, rarely above $\frac{1}{2}$ in. long, flat but rather thick, the midrib not prominent. Racemes short and dense, usually several in a terminal, leafy, flat corymb or pyramidal panicle. Outer sepals ovate, obtuse, about 1 line long; inner sepals nearly 3 lines. Petals

rather shorter, the keel not horned. Capsule usually about 5 lines long, emarginate, with rounded lobes, and about $1\frac{1}{2}$ lines broad at the top, narrowed into a stipes much longer than the broad part. Seeds comose, without any membranous appendage. —DC. *Prod.* i. 334; Hook. f. *Fl. Tasm.* i. 32; F. Muell. *Pl. Vict.* i. 190.

Queensland. Moreton Island, F. Mueller.

N. S. Wales. Port Jackson, R. Brown, *Sach.* n. 365; Blue Mountains and to the southward, A. Cunningham; New England, C. Stuart.

Victoria. Abundant in the sphagnum moors and along the rivulets and torrents of the Australian Alps at an elevation of 4000 to 6000 ft., F. Mueller.

Tasmania, R. Brown: abundant, especially in the northern parts of the island, from the sea to an elevation of 3600 ft. in the Western Mountains, J. D. Hooker.

11. **C. sylvestre**, Lindl. in *Mitch. Trop. Austr.* 342. A glabrous and erect shrub of several feet, resembling *C. retusum*, with which F. Mueller proposes to unite it, but much more glaucous. Leaves larger, often $\frac{3}{4}$ in. long and sometimes 3 lines broad, mucronate or pungent, often concave above. Flowers rather larger, with broader outer sepals. Capsule about $\frac{1}{2}$ in. long. —F. Muell. *Fragm.* i. 49.

Queensland. Open forest, near Mounts Paraday and Pluto, Mitchell; sandy forest table-land on the Suttro river, F. Mueller.

12. **C. acerosum**, Steetz, in *Pl. Preiss.* ii. 299. Glabrous, rigid, erect, and little branched from a hard, almost woody base, 1 to $1\frac{1}{2}$ ft. high. Leaves linear, erect, rigid, with a short usually pungent point, not above $\frac{1}{2}$ in. long, strongly keeled. Racemes rather dense, 1 to 2 in. long, pedicels 1 to $1\frac{1}{2}$ lines. Outer sepals 3, nearly equal, all free, very broad and obtuse, not 1 line long; inner petaloid sepals obovate, about 3 lines. Keel-petal with a horn-like appendage on the back as in *C. virgatum*. Capsule about 3 lines long, truncate or slightly 3-toothed at the top, narrowed into a stipes about as long as the broad part. Seeds comose, with a very short membrane at the chalazal end.

W. Australia. Swan River, *Dumouret*, t. 431, and *Coll.* 1843, n. 192, mixed with *C. virgatum*, which this species closely resembles in almost all characters excepting the outer sepals, which are all free.

13. **C. ericinum**, DC. *Prod.* i. 334. Glabrous or minutely pubescent, usually erect, with rigid branches 1 to 2 or even 3 ft. high, woody at the base. Leaves linear, erect or spreading, crowded or rather distant, obtuse or acute, rarely above $\frac{1}{2}$ in. long and usually shorter, the margins recurved or more frequently quite revolute. Racemes usually several and short in a leafy panicle, but longer and less dense than in *C. retusum*, rarely slender, and lengthening out to 3 or 4 in. Outer sepals all free, ovate or ovate-lanceolate, $\frac{1}{4}$ to 1 line long; inner sepals about 3 lines. Keel-petal not horned. Capsule 3 to 4 lines long, truncate, with rounded angles or entirely rounded at the top, narrowed into a stipes usually longer than the broad part. Seeds oblong, comose, with a very small membrane at the lower or chalazal end. Hook. f. *Fl. Tasm.* i. 32; F. Muell. *Pl. Vict.* i. 190; *C. coridifolium*, A. Cunn. in *Field. N. S. Wales*, 337; *C. latifolium*, Steetz, in *Pl. Preiss.* ii. 295; *C. acutifolium*, Steetz, l. c. 296; *C. linariifolium*, A. Cunn. in Steetz, l. c. 297.

Queensland. Moreton Bay, A. Cunningham; Glasshouses and Burnett ranges, F. Mueller.

N. S. Wales. Abundant about Port Jackson, *R. Brown*, *Solar.* n. 364, 534 and *Pl. Microt.* 550, and others; and in the interior, *A. Cunningham*; northward to Clarence and Hastings rivers, *Beckler*; and southward to Twofold Bay, *F. Mueller*.

Victoria. Heathy tracts, as well of the lowlands as of the mountains, not rare in the southern and eastern parts of the colony, *F. Mueller*.

Tasmania. North coast, near the sea, and islands of Bass's Straits, in sandy soil, *J. D. Hooker*.

Var. *patentifolium*. Leaves very spreading, often pinnate, very broad at the base. — Barnett ranges in the interior of N. S. Wales, *F. Mueller*. *C. patentifolium*, *F. Muell. Fragm.* i. 48. (See *F. Muell. Pl. Vict.* i. 190.)

Var. *oblongatum*, *R. Br.* Leaves oblong-linear, obtuse and mucronate, longer and with less revolute margins than usual. — East coast, *R. Brown*.

14. **C. confertum**, *Labill. Pl. Nor. Holl.* ii. 23. t. 161. Glabrous, erect, rigid, and usually branching above the middle, 1 to 2 ft. high. Leaves rather crowded, narrow-linear, thick, with the margins recurved so as to be almost terete, acute, often above 1 in. long. Flowers rather small, in slender but rather dense racemes of 2 to 3 in. or even more, on pedicels of 1 to 2 lines. Outer sepals free, broad and very obtuse, scarcely more than 1 line long; inner sepals about 2 lines. Keel-petal rather shorter, not horned. Capsule 3 lines long or rather more, rounded and sometimes emarginate, but scarcely truncate at the top, narrowed into a stipes longer than the broad part. Seeds comose, the raphe projecting and membranous, but not expanded into a terminal membrane. *DC. Prod.* i. 334; *C. longifolium*, *Steud.* in *Pl. Preiss.* i. 206; *C. hirtulum*, *Steud.* l. c. 209.

W. Australia. King George's Sound, *Labillardiere*, *R. Brown*, *A. Cunningham*, *Drummond*, *Preiss.* n. 2359, and others; E. Mount Barren, *Maxwell*.

15. **C. flavum**, *DC. Prod.* i. 334. Glabrous and erect, with rather crowded linear, almost terete leaves like *C. confertum*, but usually more branched and the leaves more spreading. Flowers yellow, larger than in *C. confertum*, in short, very dense, almost corymbose or shortly conical racemes, rarely above 1 in. long, the pedicels nearly 2 lines when in flower, and 3 when in fruit. Outer sepals all free, very short and obtuse; inner sepals $2\frac{1}{2}$ lines long. Keel-petal not horned. Capsule fully 4 lines long and not above 1 line broad, narrowed into a stipes much longer than the broad part. Seeds oblong, comose, without any prominent raphe. — *Deless. Ic. Sel.* iii. t. 20; *C. xanthocarpum*, *Steud. Pl. Preiss.* i. 209.

W. Australia. King George's Sound, *R. Brown*, *Fraser*, *A. Cunningham*, *Harey*; Swan River, *Drummond*, *Coll.* 1843, n. 490; Princess Royal Harbour, Gordon river, and Champion Bay, *Oldfield*.

16. **C. calymega**, *Labill. Pl. Nor. Holl.* ii. 23. t. 162. Glabrous or nearly so, with a perennial, sometimes woody rootstock, and simple or slightly branched, erect stems, from 6 in. to rather more than 1 ft. high. Leaves not numerous, the lower ones elliptical or oblong, the upper linear, rarely above $\frac{1}{2}$ in. long, rather thick, flat or with slightly recurved margins, without any prominent keel. Flowers small, blue, in rather slender racemes of 1 to 3 in. Outer sepals all free, oblong or lanceolate, about $1\frac{1}{2}$ lines long; inner sepals rather longer, more deeply coloured, obovate, unguiculate. Keel-petal not horned, longer than the lateral ones. Style distinctly 2-lobed. Capsule 3 to nearly 4 lines long, truncate or 3-toothed at the top, narrowed into a stipes at

least as long as the broad part. Seeds comose, without any terminal appendage.—DC. *Prod.* i. 334; Hook. f. *Fl. Tasm.* i. 32; F. Muell. *Pl. Vict.* i. 188; *C. isocalyx*, Spreng. *Syst. Veg.* iii. 172; *C. strictum*, Endl. in Hueg. *Enum.* 7; *C. tenue*, Steud. in *Pl. Preiss.* i. 208; *C. varians* and *C. parviflorum*, Steud. l. c. 210; *C. herbaceum*, Steud. l. c. 211 (the last synonym taken from Steetz, in *Pl. Preiss.* ii. 307); *C. spathulatum*, Turcz. in *Bull. Mosc.* 1854, ii. 352 (from the character given).

Victoria. Bushy barren ridges and mountains, and arid heathy plains in many parts of the colony, *F. Mueller*.

Tasmania. *R. Brown*; common on sandy flats along the north shores of the island and in the islands of Bass's Straits, *J. D. Hooker*.

S. Australia. Kangaroo Island, St. Vincent's Gulf, and Lofty and other ranges in the interior, *F. Mueller*, *Behr*, etc.

W. Australia. King George's Sound to Swan River, *Drummond*, *Preiss.* n. 2365, 2374, etc., and others; Murchison river, *Oldfield*.

Var. *latifolium*. Lower leaves obovate, $\frac{1}{2}$ to 1 in. long; upper leaves few, small, and distant. Capsule 5 lines long. Swan River, *Drummond*; King George's Sound, *R. Brown*.

17. ***C. lanceolatum***, *R. Br. Herb.* Nearly allied to *C. calymega*, excepting in the fruit. Stems slender, erect, glabrous, not above 6 in. high, or branching and decumbent at the base. Leaves small, narrow-linear, rather rigid, erect and acute, mostly 2 to 3 lines long. Racemes short. Flowers blue, rather larger than in *C. calymega*. Outer sepals all free, oblong, thin, nearly 2 lines long; inner ones scarcely longer. Capsule elliptical or oblanceolate, tapering rather more at the base than at the point, nearly 3 lines long and rather more than 1 line broad. Seeds oblong, fully half as long as the capsule, comose, without any terminal appendage.

W. Australia. S. coast, east of King George's Sound, *R. Brown* (*Hb. R. Br.*).

18. ***C. defoliatum***, *F. Muell. Pl. Vict.* i. 189. Allied in habit to *C. nudiusculum* with the flowers of *C. calymega*. Rhizome woody, with rigid and rush-like, but slender and sometimes almost filiform stems, 1 to 2 ft. high, and glabrous. Leaves very few and distant, small, narrow-linear or sometimes all reduced to small linear scales. Racemes slender, 1 to 2 in. long. Flowers rather larger than in *C. calymega*. Outer sepals all free, oblong, nearly as long as the inner ones. Capsule 3 or 4 lines long, contracted into a long narrow stipes. Seeds comose, without any terminal appendage.—*C. nudiusculum*, Steetz, in *Pl. Preiss.* ii. 308, not DC.

N. S. Wales. Port Jackson and Hunter's River, *R. Brown*; Illawarra, *Shepherd*; Clarence river, *Buckler*.

Victoria. Scattered over sandy heathy ridges from Port Phillip to the Broadbribb river, *F. Mueller*.

Tasmania. South Port, *C. Stuart*.

19. ***C. nudiusculum***, *DC. Prod.* i. 334. Stems elongated, slender, glabrous, with few very small distant leaves almost reduced to scales. Flowers small, blue, in a very short raceme, which after flowering lengthens to 1 in. or more. Outer sepals about $1\frac{1}{2}$ lines long, oblong, the 2 upper connate to near the top; inner sepals not twice as long, usually about 2 lines, broadly obovate, with a short claw adhering to the corolla. Keel-petal not horned, lateral ones narrow. Style much thickened above. Capsule about 3 lines long, narrowed into a stipes about twice as long as the broad part. Seeds

comose, without any terminal membrane.—*C. ramosissima*, Steud. in Pl. Preiss. i. 209; *C. megapterygia*, Steud. l. c. 207 (according to Steetz, in Pl. Preiss. ii. 314).

W. Australia. King George's Sound, *R. Brown*, *A. Cunningham*, *Fraser*, *Preiss*, n. 2369, 2370, and others; Mount Barker, *Oldfield*.

20. ***C. virgatum***, *Labill. Pl. Nov. Holl.* ii. 21, t. 159. Glabrous, with a woody rootstock and erect, stiff, simple or somewhat branching stems, 1 to 1½ or rarely 2 ft. high. Leaves distant or rather crowded, linear or linear-lanceolate, obtuse or scarcely pointed, rarely exceeding ½ in. in length, with the midrib or keel prominent underneath. Flowers blue, rather numerous, in a raceme of 1 to 3 in., often lengthening out after flowering to nearly 6 in., the pedicels from 1 to 2 lines. Bracts with a fine point, often comose in the young raceme, but falling off during flowering. Outer sepals about 1 line long, the 2 upper ones united to near the top; inner sepals nearly 3 lines long. Keel-petal very broad, with a horn-like appendage on the back near the top, sometimes above ½ line long, sometimes reduced to a small tubercle. Style winged towards the top. Capsule about 3 lines long, truncate or 3-toothed, and about 1 line broad at the top, narrowed into a stipes as long as the broad part. Seeds ovate, comose with a small membranous appendage at the chalazal end.—DC. Prod. i. 334; Steetz, in Pl. Preiss. ii. 311; *C. simplex*, Endl. in Hueg. Enum. 7; *C. corniculatum*, Steud. in Pl. Preiss. i. 206; *C. longebracteatum* and *C. roseum*, Steud. l. c. 207; *C. contractum* and *C. annulatum*, Steud. l. c. 208; *C. larinsculum*, Steud. l. c. 210; *C. selaginoides*, Turez. in Bull. Mosc. 1854, ii. 352.

W. Australia. Apparently common, from the south coast to Swan River, *Labillardiere*, *A. Cunningham*, *Drommond*, n. 215, 489, 492 (mixed in some cases with *C. acrosum*), *Preiss*, n. 2360, 2361, 2363, 2371, etc; *Champion Bay*, *Bower*.

C. corniculatum, Steud., and *C. acrosum*, Steud., are both kept up by Steetz, in Pl. Preiss. ii. 310, but the differences indicated do not appear to me to be quite borne out by the inspection of *Preiss*'s specimens.

21. ***C. polygaloides***, *F. Muell. in Trans. Phil. Soc. Vict.* i. 7, and *Pl. Vict.* i. 187, t. 8. Very near *C. virgatum*, but a smaller plant, with a less woody rootstock, and more simple stems, rarely 1 ft. high. Leaves from linear to oblong, flat, without the prominent keel of *C. virgatum*, rarely above ½ in. long. Outer sepals slightly longer and less obtuse than in *C. virgatum*, the two upper ones connate as in that species. Keel-petal without any dorsal appendage. Capsule about 4 lines long, narrowed into a stipes nearly twice as long as the broad part. Seeds very comose, without any terminal membrane.

Victoria. Scattered over the low ridges and barren plains of the southern and western parts of the colony, *F. Mueller*.

S. Australia. Near Adelaide, *Whittaker*; Rivoli Bay and Encounter Bay, *F. Mueller*; Kangaroo Island, *Waterhouse*; Spencer's Gulf, *Warburton*.

ORDER XV. FRANKENIACEÆ.

Flowers regular, hermaphrodite. Calyx tubular, persistent, with 4, 5, or rarely 6 lobes, valvate in the bud, and as many prominent angles and furrows.

Petals as many, hypogynous, imbricate in the bud, free, the claws with an adnate plate or appendage on the inner face, the lamina spreading. Stamens usually 6, sometimes 4 or 5 or indefinite, hypogynous, free or shortly united in a ring at the base; filaments filiform or flattened; anthers 2-celled, versatile. Ovary free, sessile, 1-celled, with 3, rarely 2 or 4, parietal placentas, or very rarely a single one. Style filiform, with as many branches as placentas, the stigmas capitate or oblique. Ovules several, or rarely solitary, to each placenta, attached to rather long ascending funicles, amphitropous or nearly anatropous, with an inferior micropyle. Seeds ovoid or oblong, testa crustaceous, the hilum almost terminal. Embryo straight, in a mealy albumen, the radicle next the hilum, shorter than, or as long as, the cotyledons.—Low herbs or undershrubs, much branched and jointed at the nodes. Leaves opposite, small, without stipules, often clustered in the axils. Flowers usually pink or purple, sessile in the forks of the branches, forming a more or less dense, terminal, leafy cyme, sometimes contracted into a globular head.

The Order consists of a single genus, closely allied to the small group of *Dicathoe*, amongst *Caryophyllæ*, but distinguished by the parietal placentation of the ovary, and by the terminal hilum in the seed. The species are chiefly maritime, and generally distributed over the temperate regions of the globe, more especially of the northern hemisphere, less abundant within the tropics.

1. **FRANKENIA**, Linn.

Characters and distribution those of the Order.

The Australian species are all endemic, although the common one is closely allied to one of those most widely spread in the northern hemisphere.

Flowers in dense terminal heads.

Floral leaves ovate-lanceolate, flat, several times broader than the

linear-terete stem-leaves

1. *F. bracteata*.

Floral leaves linear-terete, like the stem-leaves

2. *F. glomerata*.

Flowers solitary, or in leafy terminal cymes.

Leaves distinctly (but minutely) petiolate on the margin of the sheath.

Petals slightly cohering by their claws. Filaments slightly dilated and often cohering in a tube.

Leaves much longer than their sheath. Calyx 2 to 3 lines

3. *F. pauciflora*.

Leaves scarcely longer than their sheath. Calyx about 1 line

4. *F. parvula*.

Petals quite free. Filaments shortly and broadly dilated at the base, free and narrow upwards

5. *F. Drummondii*.

Leaves sessile, the dorsal furrow continued to the base of the sheath.

Leaves not produced below their insertion

6. *F. tetrapetala*.

Leaves produced at the base into a free, although closely appressed appendage

7. *F. punctata*.

(*Frankenia cymbifolia*, Hook, is *Wilsonia humilis*.)

1. ***F. bracteata***, Turcz. in Bull. Mosc. 1851, ii. 367. Stems, from a woody base, erect, ascending, or decumbent, 3 to 6 in. long, glabrous or slightly pubescent. Leaves all opposite, linear-terete, 2 to 4 lines long, smooth and shining, the margins so closely revolute as to conceal the hairy under-surface, showing only a dorsal furrow, distinctly petiolate on the edge of a broad sheath, from which they early fall off, leaving a cluster of smaller similar leaves arising from within the sheath. Cymes of flowers contracted into dense

heads, the bract-like floral leaves in whorls of 4 almost without sheaths, ovate-lanceolate or nearly ovate, flat, ciliate, and closely imbricate, so as to conceal the calyces. Calyx $2\frac{1}{2}$ to 3 lines long. Corolla and stamens of *P. pauciflora*. Style-branches and placentas 3. Ovules solitary to each placenta, attached to rather long funicles arising from near the base of the ovary.

W. Australia, Drummond, *Coll.* 1845, n. 136.

2. **F. glomerata**, Turcz. in *Bull. Mosc.* 1854, ii. 368. An apparently erect or ascending dichotomous shrub or under-shrub of 6 to 8 in., glabrous or nearly so. Leaves opposite and clustered in the axils, linear-terete, 3 to 4 lines long, the margins ciliate and closely revolute so as only to show a dorsal furrow, and distinctly petiolate like those of *F. bracteata*, but the sheath shorter. Flowers in dense, terminal, leafy heads like those of *F. bracteata*, but the floral leaves are linear-terete like the stem ones. Calyx slender, about 3 lines long. Petals long and linear, slightly narrowed into long claws, with a scarcely prominent longitudinal line towards the top of the claw. Ovary in the few flowers I examined 1-ovulate, with a simple style, but perhaps not constantly so.

W. Australia, Drummond, 5th *Coll. Suppl.* n. 79.

3. **F. pauciflora**, DC. *Prod.* i. 350. Shrubby and procumbent or almost erect at the base, with ascending, erect, or divaricate dichotomous branches, nearly glabrous or hoary with a short down or scaly pubescence, often very low and spreading, sometimes above a foot high, attaining even 3 ft. according to F. Mueller. Leaves opposite or the upper ones in whorls of 4, oblong or linear, obtuse or rarely almost acute, the margins usually revolute so as only to show a dorsal furrow, when very narrow above 3 lines long, but usually much shorter, the very short sheathing petioles ciliate on the edge, with smaller leaves often clustered in the axils. Flowers closely sessile in the last forks, forming a more or less dense terminal leafy cyme and sometimes unilaterally arranged along its branches owing to the abortion of one branch of each fork. Calyx 3 to 4 lines, or rarely only $2\frac{1}{2}$ lines long. Petals with their claws cohering in an angular tube, the longitudinal appendage not very prominent, the lamina obovate, entire or crenulate. Stamens 5 or 6, with their filaments slightly dilated and usually cohering. Placentas 3 or rarely 2, with 2 to 4 ovules to each. Bot. Mag. t. 2896; Hook. f. *Fl. Tasman.* i. 40; *F. scabra*, Lindl. in *Mitch. Trop. Austr.* 305.

N. Australia. Sturt's Creek, *F. Mueller*; N. W. coast, *Bynoe*.

Queensland. In the interior on the Nive river, *Mitchell*.

N. S. Wales. Desert on the tributaries of the Darling and Murray rivers, *F. Mueller*.

Victoria. Saline marshes on the coast, more common in saline or sandy depressions along the Murray river and its tributaries, *F. Mueller*.

Tasmania, *R. Brown*; abundant on Goose Island in Bass's Straits; found also at Circular Head, *Gunn*.

S. Australia. On the coast, and particularly abundant in the saline districts in the northern part of the colony, *F. Mueller* and others.

W. Australia. Common both on the southern and western coasts, *Drummond, Coll.* 1843, n. 105, and 5th *Coll.* n. 77 and 78, and others; Dirk Hartog's Island, *A. Cunninghamham*.

An exceedingly variable species, which F. Mueller (*Pl. Vict.* i. 82) unites with the common European and African *F. laevis*, Linn.; the latter species, however, much as it varies,

has always much smaller and finer leaves, and especially very much smaller flowers, and the general aspect is so different, that it is not to be expected that the proposed union should be generally admitted. Possibly also the two following Australian varieties of *F. parviflora* may prove sufficiently constant to be admitted as species.

Var. *serpyllifolia*. Pubescent or hirsute. Leaves, especially the lower ones short, from oblong to broadly ovate, the margins often much less recurved than in the typical *F. parviflora*.—*F. serpyllifolia*, Lindl. in Mitch. Trop. Austr. 305. —Nive river, Mitchell. Murchison river, Drummond. Allied to this variety is the plant from Port Jackson, which de Candolle, Prod. i. 349, referred with doubt to the *F. paleocarpa*, Linn. The specimens in the herbarium of the Paris Museum have much the aspect of the latter species (very prostrate, with small broad flat leaves, more petiolate than is usual in *F. parviflora*), yet I think they may prove to be only one of its numerous varieties, very near to the *serpyllifolia*.

Var. *thymoides*. More woolly, erect, and much branched, with the habit of *Thymus vulgaris*, hoary all over, with a minute scaly indumentum. Leaves oblong, very obtuse, much revolute, 1 to nearly 2 lines long. Flowers rather small, the appendage of the petal-claws very prominent. Ovules 4 to 6 to each placenta.—Mount Goniagbear, *Victoria expedition*.—*F. fruticulosa*, DC. Prod. i. 350, appears to connect this variety with the more common forms.

4. **F. parvula**, Turcz. in Bull. Mosc. 1851, ii. 368. Stems shortly creeping, with numerous ascending branches of 1 to $1\frac{1}{2}$ in., glabrous or nearly so. Leaves crowded, oblong, obtuse, not above 1 line long, thick, but the margins closely revolute, concealing the under surface and showing only a dorsal furrow, distinctly petiolate on the margin of a broad, strongly ciliate sheath often nearly as long as the leaf, with 3 or 4 smaller leaves clustered within the sheath. Flowers terminal, solitary or in little leafy heads of 2 or 3. Calyx thickly ribbed, almost ovoid, a little more than 1 line long, strongly ciliate at the top. Petals obovate. Style 3-cleft. Ovules apparently few, but not seen in a good state.

W. Australia, Drummond, 5th Coll. Suppl. n. 81.

5. **F. Drummondii**, Benth. Stems prostrate and rooting at the nodes, with numerous short, erect branches, quite glabrous in our specimens. Leaves crowded, opposite or the floral ones in fours, linear-terete, about 2 lines long, distinctly petiolate, with a very short sheath, very red as well as the calyces in our specimens. Flowers small and solitary. Calyx slender, not 2 lines long. Petals all free, with a rather broad claw and a very prominent ovate-oblong scale, the lamina small and obovate. Stamens free, the filaments dilated at the base into an oval-oblong scale, filiform above. Style 3-cleft. Ovules 1 or 2 to each placenta.

W. Australia, Drummond, n. 278.

6. **F. tetrapetala**, Labill. Pl. Nov. Holl. i. 88, t. 114. Shrubby and prostrate at the base, rooting at the joints, with numerous branches, short and ascending or erect and much branched, often attaining 4 to 6 in., glabrous or minutely pubescent. Leaves crowded, but all opposite, linear-terete, acute or obtuse, 1 to 2 or rarely 3 lines long, not petiolate, but connate at the base into a short sheath, the dorsal furrow extending below their union, but without the appendage of *F. punctata*. Flowers small, like those of *F. punctata*, 5-merous in the specimens I have examined, but very likely to be occasionally 4-merous, as described by Labillardière.

W. Australia. King George's Sound and other points of the S. coast, R. Brown,

Bauer, Bagster; Young River and Fitzgerald rivers, *Maxwell*; Swan River? *Drummond*, *l. n.* 279. Labillardiere's specimens are said to have come from Tasmania; but there is very likely to have been some mistake. I have been unable to examine any flowers from them, but their habit and foliage leave no doubt as to their specific identity with those above described.

Var. (?) *brachyphylla*. Leaves, as in *P. punctata*, scarcely more than 1 line long and very obtuse, but not produced at the base. *Drummond*, *5th Coll. Suppl. n.* 80.

7. **F. punctata**, *Turez. in Bull. Mosc.* 1854, ii. 367. Shrubby and procumbent at the base, with numerous shortly ascending branches, glabrous or minutely pubescent. Leaves crowded, but all opposite, oblong or shortly linear, obtuse, 1 to $1\frac{1}{2}$ lines long, not petiolate, but connate near the base, and produced below their insertion into a short obtuse appendage, closely pressed against the stem although free from it. Flowers small, on very short, leafy, lateral shoots. Calyx cylindrical, scarcely 2 lines long. Petal-claws free or scarcely cohering.

W. Australia, *Drummond*, *Coll.* 1845, *n.* 137.

ORDER XVI. CARYOPHYLLÆ.

Flowers regular, usually hermaphrodite. Sepals 4 or 5, persistent, free or united in a toothed calyx, imbricate in the bud. Petals either as many as the sepals hypogynous or slightly perigynous, entire or lobed, imbricate and frequently contorted in the bud, or rarely minute and scale-like or none. Stamens 8, 10, or fewer, inserted with the petals. Filaments filiform. Anthers 2-celled. Torus small or in a few *Sileneæ* lengthened into a gynophore, or in some *Alsineæ* forming a small disk, shortly adnate to the base of the calyx, or short glands between the stamens. Ovary free, 1-celled or partially divided especially at the base into 2 to 5 cells. Styles 2 to 5, linear and stigmatic along the inside from the base or towards the top, free or more or less united into 1 branching style. Ovules 2 or more, often numerous, attached to a short or columnar placenta in the centre of the ovary, amphitropous and usually curved. Capsule membranous or crustaceous, very rarely succulent, opening at the top in as many or twice as many teeth or valves as there are styles, very rarely indehiscent. Seeds several, rarely solitary by abortion, with a membranous or crustaceous testa. Albumen mealy. Embryo curved round the albumen, or rarely straight or nearly so, and excentric, with the radical inferior, or, when the embryo is circular, turned upwards.—Herbs, very rarely shrubby at the base, usually thickened and jointed at the nodes. Leaves opposite and entire, usually connected by a transverse line or short sheath at the base. Stipules none, or small and scarious. Inflorescence centrifugal, usually forming a terminal leafy cyme, rarely panicle or racemose, or the pedicels all axillary.

A large Order, especially abundant in the extratropical regions of the northern hemisphere, rather less so in the high mountain-ranges of tropical America and Asia, and in the more temperate regions of the southern hemisphere, very rare in hot tropical countries. Of the Australian genera none are endemic. One, *Polycarpha*, is chiefly tropical and almost limited to the Old World; another, *Drymonia*, is also chiefly tropical, but almost entirely American; a third, *Colobanthus*, is chiefly extratropical and limited to the southern hemisphere; a fourth, *Stellaria*, has almost as wide a range as the Order itself; the remaining

genera and species, whether indigenous or introduced, are all European or East-Mediterranean.

TRIBE I. **Sileneæ**.—*Sepals united in a 4- or 5-toothed calyx. Petals and stamens hypogynous, often raised on a stalk-like torus. Styles distinct from the base. Stipules 0.*

Calyx many-nerved, with 2 or more bracts at the base. Styles 2.

Seeds flat. Embryo straight	DIANTHUS (p. 156).
Calyx broadly or obscurely 5-nerved. Styles 2	1. GYPSOPHILA.
Calyx 10-nerved. Styles 3	2. SILENE.
Calyx 10-nerved. Styles 5	LYCHNIS (p. 156).

TRIBE II. **Alsineæ**.—*Sepals free or only united by the disk at their base. Petals and stamens hypogynous or slightly perigynous, the torus not elongated. Styles distinct from the base. Stipules 0, or rarely small and scarious.*

Petals usually 2-cleft.

Capsule cylindrical or conical, opening equally in twice as many teeth as styles. Styles 5, opposite the sepals, or rarely 4 or 3 3. CERASTIUM.

Capsule globular or ovoid, opening in as many 2-cleft valves as styles. Styles 3, or if 5, alternate with the sepals 4. STELLARIA.

Petals entire or none.

Sepals 5. Styles usually 3. Capsule globular or ovoid.

No stipules.

Petals white, entire ARENARIA (p. 159).

Petals none 4. STELLARIA.

Stipules small and scarious. Petals pink 7. SPERGULARIA.

Sepals, styles, and capsular valves 4 or 5.

No stipules. Leaves opposite.

Stamens twice as many as sepals, or if of the same number, opposite to them 5. SAGINA.

Stamens of the same number as the sepals and alternate with them 6. COLOBANTHUS.

Stipules small and scarious. Leaves clustered so as to appear verticillate SPERGULA (p. 161).

TRIBE III. **Polycarpææ**.—*Sepals of Alsineæ. Petals usually very small or none. Stamens 5 or fewer, hypogynous or slightly perigynous. Style single at the base, with 3 or 2 branches or minute teeth. Stipules scarious or very minute.*

Petals lobed. Style very short. Stipules minute 8. DRYMARIA.

Petals entire. Style short. Stipules scarious 9. POLYCARPON.

Petals entire, or notched. Style elongated. Stipules and sepals scarious 10. POLYCARPÆA.

TRIBE I. **SILENEÆ**.—*Sepals united in a 4- or 5-toothed calyx. Petals and stamens hypogynous, often raised on a stalk-like torus. Styles distinct from the base. Stipules none.*

1. GYPSOPHILA, Linn.

Calyx campanulate or turbinate-tubular, 5-toothed or 5-lobed, broadly 5-nerved, membranous between the nerves. Petals 5, with a narrow claw, and without any scale. Torus small. Stamens 10. Styles usually 2. Capsule globular or ovoid, opening to the middle or lower down in 4 valves. Seeds nearly reniform; embryo curved round the albumen. Herbs, mostly glaucous, sometimes glandular or hirsute. Flowers usually small, numerous, and paniculate, or solitary in the forks of the stem.

A genus limited to the extratropical regions of the northern hemisphere in the Old World with the exception of the following species. It is chiefly distinguished from *Saponaria* by the calyx.

1. **G. tubulosa**, Boiss. *Diaga. Pl. Gr.* i. 11. A slender erect dichotomous annual, often not above 2 or 3 in., but sometimes 8 to 10 in. high, more or less viscid-pubescent, and often slightly hirsute. Leaves linear-subulate, rarely attaining $\frac{1}{2}$ in., and often much shorter. Pedicels in the forks, or sometimes appearing axillary from 1 branch only being developed, 1 to 8 lines long, erect or spreading. Calyx erect, $1\frac{1}{2}$ lines long, narrower than in most *Gypsophilas*, with 5 prominent nerves, the teeth short and obtuse. Petals red, narrow-oblong, a little longer than the calyx. Capsule ovoid-oblong, rather exceeding the calyx. Seeds black, elegantly pitted under a lens.—F. Muell. Pl. Viet. i. 206; *Dichoglottis tubulosa*, Jaub. and Spach, Ill. Pl. Or. i. 14 t. 6; *D. australis*, Schlecht. *Linnæa*, xx. 631.

N. S. Wales. Cook's River and Nepean river, R. Brown; Cox's River, A. Cunninghamham.

Victoria. Sandy localities, by no means rare, F. Mueller.

Tasmania. (F. Mueller, l.c.) I have seen no specimens from the island.

S. Australia. In sandy localities, near Bethanie, Behr.

W. Australia, Drummond, n. 93.

A native of the East Mediterranean region of Europe and Asia, possibly introduced into Australia and New Zealand, where it is also found; yet from the localities where it was so early collected by R. Brown, and its general diffusion over extratropical Australia, it is difficult to conceive how a plant unknown in those parts of Europe whence the early colonists proceeded should have so promptly established itself. It is allied to the more common *G. muralis*, which, however, has not been detected in Australia, and is always quite distinct, especially in the form of the calyx, which is that of a true *Gypsophila*, whilst *G. tubulosa* is in this respect almost intermediate between that genus and *Saponaria*.

2. SILENE, Linn.

Calyx 10-nerved, rarely many-nerved, 5-toothed or 5-lobed. Petals 5, with a narrow claw, and usually with a double scale. Stamens 10. Torus usually elongated. Styles usually 3. Capsule opening in 6 or rarely 3 teeth or short valves. Seeds laterally attached; embryo curved round the albumen.—Herbs. Flowers solitary or cymose, often forming unilateral spikes or an oblong thyrus or panicle.

A very large genus, chiefly abundant in Europe, N. Africa, and temperate Asia, with a few N. American and S. African species, and only introduced into Australia.

*1. **S. gallica**, Linn.; DC. *Prod.* i. 371. A hairy, slightly viscid, much branched annual, 6 in. to nearly 1 ft. high, erect or decumbent at the base. Lower leaves small and obovate, upper ones narrow and pointed. Flowers small, nearly sessile, generally all turned to one side, forming a simple or forked terminal spike, with a linear bract at the base of each flower. Calyx very hairy, with 5 slender teeth, at first tubular, afterwards ovoid and much contracted at the top. Petals very small, entire or notched, pale red or white, or in one variety with a dark spot.—*S. anglica*, *lusitanica*, *cerastoides* and *quinqneculnera*, Linn.; Reichb. Ic. Fl. Germ. vi. t. 272, 273.

A plant probably of South European origin, now common in sandy, gravelly, and waste places, especially near the sea, in most parts of the world, and established in Australia.

lian colonies, especially about Swan River, from whence it is so frequently sent with indigenous plants, that it cannot be omitted from the Australian Flora.

Dianthus barbatus, Linn.; DC. Prod. i. 355, the European *Sweet-William*, and *D. Armeria*, Linn., DC. l. c., a common European species, are in F. Mueller's Herbarium as introduced plants, the latter as having been found on the stony crests of the ridges on Darchin Creek.

Lychnis Githago, Lam.; DC. Prod. i. 387, the *Corn Cockle*, a common cornfield weed, probably of East Mediterranean origin, has been introduced with European corn into some of the Australian colonies, as in many other countries. It is a tall, erect annual, clothed with long whitish appressed hairs. Leaves long and narrow. Flowers on long leafless peduncles, rather large and red, remarkable for the long green linear lobes of the calyx projecting much beyond the petals; the latter are broad, undivided, without scales. Stamens 10. Styles 5. Capsule opening in 5 teeth.

Lychnis Celi-rosa, Dur.; DC. Prod. i. 386, is also in F. Mueller's Herbarium as an introduced plant at Shipton.

TRIBE II. ALSINÆÆ.—Sepals free, or only united by the disk at their base. Petals and stamens hypogynous or slightly perigynous, the torus not elongated. Styles distinct from the base.

3. CERASTIUM, Linn.

Sepals 5, rarely 4. Petals as many, usually notched or 2-cleft. Stamens 10 or fewer. Styles 5 or 4, opposite the sepals, or rarely 3. Capsule cylindrical or conical, often incurved, opening at the top in twice as many teeth as styles, all equal. Seeds more or less reniform.—Herbs, usually pubescent or hirsute. Leaves rarely subulate. Cymes terminal, dichotomous, leafy, or the floral leaves reduced to small or scarious bracts. Seeds usually pitted or muricate.

A considerable genus, distributed chiefly over the temperate regions of the northern hemisphere, more especially in the Old World, rare within the tropics except in mountain regions. The Australian species is not endemic and perhaps introduced only.

1. *C. vulgatum*, Linn.; DC. Prod. i. 415. A coarsely pubescent usually more or less viscid annual, branching at the base, sometimes dwarf, erect, and much branched, at others loosely ascending to 1 foot or even 2 feet, occasionally forming at the end of the season dense matted tufts, which may live through the winter, and give it the appearance of a perennial. Radical leaves small and petiolate; stem leaves sessile, from broadly ovate to narrow oblong. Sepals 2 to $2\frac{1}{2}$ lines long, green and pubescent, but with more or less conspicuous scarious margins. Petals seldom exceeding the calyx, and often much shorter, sometimes very minute, or even none. Stamens often reduced to 5 or fewer. Capsule cylindrical, often curved and projecting beyond the calyx.—Reichb. l. c. Fl. Germ. v. t. 228, 229; *C. viscosum*, Linn.; DC. l. c. 416.

Queensland. Near Brisbane, *Henne*.

N. S. Wales. Port Jackson and Paramatta, but in the former case introduced, *R. Brown*; Clarence river, *Beckler*; Twofold Bay, *F. Mueller*.

Victoria. Common about Melbourne, also on the Murray, *F. Mueller*; Wimmera river, *Dallachy*.

Tasmania. Widely diffused even in almost inaccessible places, as among rocks on the North Esk river, *Gunn*, *J. D. Hooker*.

S. Australia. In good soils, *Behr*.

W. Australia. Common about Swan River, *Dumoulin*, 1st Coll., 2nd Coll. n. 698, Coll. 1848, n. 107.

Exceedingly common in the temperate regions of the northern hemisphere and now naturalized in many parts of the globe. In Australia also it is evidently introduced in many localities, but probably also indigenous. Brown, in 1802, distinguished as such his Parramatta specimens from the evidently introduced ones of Port Jackson, and Gunn found it abundant in Tasmania in localities where it was difficult to believe it to be a foreign importation. The Australian varieties are some of those most common in Europe; the var. *glomeratum*, DC. l. c., with broad orbicular leaves and compact inflorescence, most abundant in Victoria and Tasmania, and the var. *viscosum*, with oblong or narrow leaves and loose elongated cymes, in N. S. Wales and W. Australia; but very many specimens are quite intermediate. The smaller forms, with 4-merous flowers or 5 or fewer stamens, are not among the Australian specimens I have seen.

4. STELLARIA, Linn.

Sepals 5, rarely 4. Petals as many, usually 2-cleft, rarely wanting. Stamens 10 or fewer. Styles 3, rarely 2 or 4, or very rarely 5, and then alternate with the sepals. Capsule globular, ovoid or oblong, opening to below the middle in twice as many valves as styles, or in an equal number of 2-cleft valves.—Herbs usually diffuse, tufted or ascending, glabrous or pubescent. Leaves rarely subulate. Flowers solitary, or in loose leafless or leafy cymes. Seeds usually pitted or muricate.

A considerable genus, spread over nearly the whole globe, although within the tropics confined to mountain districts. Of the 5 Australian species 3 are endemic, one, *S. glauca*, although truly indigenous, is identical with a European species, the fifth, *S. media*, is an introduced weed.

Petals longer than or nearly as long as the sepals.

Leaves mostly sessile, linear or lanceolate. Pedicels axillary. Perennials.

Leaves rigid and pungent, mostly linear-lanceolate, often recurved. 1. *S. pungens*.

Leaves linear, slender 2. *S. glauca*.

Leaves mostly petiolate, ovate or ovate-lanceolate. Pedicels axillary.

Perennial without any pubescent line 3. *S. flaccida*.

Leaves sessile or petiolate, broadly ovate. Pedicels in the forks.

Annual, with a pubescent line down each internode 4. *S. media*.

Petals none. Annual, with small sessile leaves 5. *S. multiflora*.

1. ***S. pungens***, *Brongn. Voy. Cog. l. 78*. Perennial and very much branched, decumbent or ascending amongst bushes, often to 3 or 4 ft., with angular branches, smooth and shining, glabrous, or hirsute with loose scattered hairs. Leaves lanceolate to linear, rigid and pungent, mostly 3 to 4 lines long, and never exceeding $\frac{1}{2}$ in., often spreading or recurved, all sessile or scarcely narrowed at the base, the lower ones sometimes small and crowded. Pedicels axillary, very variable in length, but usually considerably exceeding the leaves. Sepals rigid, pungent, about 3 lines long, the outer ones prominently 3-nerved. Petals about as long or rather longer, deeply cleft.—Hook. f. Fl. Tasm. i. 44.; F. Muell. Pl. Vict. i. 209; *S. squarrosa*, Hook. Journ. Bot. i. 250.

N. S. Wales. Blue Mountains and adjoining districts, *A. Cunningham*; New England, *C. Stuart*.

Victoria. Rocky, stony, or sandy places, not unfrequent throughout the greater part of the colony, ascending to the Australian Alps, but not extending into the desert, *F. Mueller*.

Tasmania. Port Dalrymple, *R. Brown*; common in rich and poor, moist and dry soils, *J. D. Hooker*.

2. ***S. glauca*, With.; DC. Prod. i. 397.**—Perennial, usually glabrous, smooth, and shining, with slender ascending or erect branches, often 1 to 2 ft. high, but sometimes low and intricate. Leaves linear, acute, $\frac{3}{4}$ to $1\frac{1}{2}$ in. long, or the upper ones short. Pedicels axillary or terminal, slender but rigid, longer than the leaves. Sepals very acute, 3-nerved, about 3 lines long when in flower. Petals about as long, or rather longer, deeply cleft. Capsule ovate, much shorter than the calyx, which usually lengthens after flowering.—Reichb. Ic. Fl. Germ. v. t. 223; Hook. f. Fl. Tasm. i. 44. F. Muell. Pl. Vict. i. 210; *S. angustifolia*, Hook. Journ. Bot. i. 250.

Queensland. Plains of the Condamine river, *Leichhardt*.

N. S. Wales. Marshy places, Longmeadow, etc., *R. Brown*; Lachlan river, *A. Cunninghamham*.

Victoria. Moist, rocky, grassy, or sandy localities, scattered over a considerable extent of the colony, *F. Mueller*.

Tasmania. Marshes in various localities, *J. D. Hooker*.

S. Australia. Extending to St. Vincent's Gulf, *F. Mueller*.

Var. *cæspitosa*, Hook. f. Fl. Tasm. i. 44. Stems short and very intricate, or densely tufted. Leaves lanceolate-linear. Sepals short and more obtuse.—*S. cæspitosa*, Hook. f. in Hook. Journ. Bot. ii. 411. Tasmania, *Gunn*; and on the Murray in Victoria, *F. Mueller*. The specimens show a very gradual passage from this form to the elongated one, in the leaves as well as in the sepals. A similar gradation takes place in the N. American *C. longipes*, an allied species, yet, to my eyes, always distinct in inflorescence as well as in foliage.

Var. (?) *leptoclada*. Annual or, at any rate, flowering the first year, with slender, ascending, erect stems of 5 to 6 in., much branched at the base. Pedicels slender. Flowers small, as in the last variety, but the sepals more acute.—New England, *C. Stuart*.

Var. (?) *tenella*. Tufted and intricately branched, like the var. *cæspitosa*, but smaller and much more slender, with crowded, very small leaves; one specimen, with some branches elongated, with narrow-linear leaves. Flowers few, small. Sepals rather obtuse.

Victoria. Near Melbourne, *Adamson*; Glenelg river, *Robertson*.

Tasmania. Derwent river and Kitt's Group in Bass's Straits, *R. Brown*; granite rocks in St. Patrick's river, *Gunn*.

The *S. glauca* is generally diffused over Europe and temperate Asia, and the Australian form, in its elongated state, cannot at all be distinguished from many European specimens grown in similar localities. The northern plant has, however, more frequently larger petals, and has sometimes a tendency to assume a paniculate inflorescence, with the floral leaves reduced to small bracts, approaching that of *S. graminea*; the Australian plant, on the contrary, tends rather, in its extreme varieties, towards the intricate stems and habit of *S. pungens*.

3. ***S. flaccida*, Hook. Comp. Bot. Mag. i. 275.** Apparently perennial, with weak and decumbent very intricate branches, often extending to several feet, glabrous and shining, or with loose spreading scattered hairs especially about the nodes. Leaves ovate to lanceolate, very acute, thin and flaccid, often undulate on the margin, narrowed and ciliate at the base, rarely exceeding $\frac{1}{2}$ in. without the petiole, which is long in the lower leaves, short or none in the upper ones. Pedicels all axillary, and usually 1 to $1\frac{1}{2}$ in. long. Sepals 2 to $2\frac{1}{2}$ lines long, broadly lanceolate, acute, with a scarious border, usually 3-nerved, but the lateral nerves often very faint, often ciliate. Petals rather longer, deeply cleft. Capsule ovoid, usually exceeding the calyx.—*S. media*, var., Hook. f. Fl. Tasm. i. 43; F. Muell. Pl. Vict. i. 211.

N. S. Wales. Shoal Spit Reach, *R. Brown*; Hastings river, *Beckler*.

Victoria. Shady humid places, forest lands, and gravelly banks of rivers, from the lowlands to the highest Alps, *F. Mueller*.

Tasmania. Dense thickets and shady places, *J. D. Hooker*; Port Dalrymple, *R. Brown*.

I cannot agree in considering this a variety of *S. media*. Besides the difference in habit, in the shape of the leaves and sepals, and in the inflorescence, the hairs, when present, are long cilia on the edges and nerves of the leaves and sepals, or on the angles of the branches, without any trace of the unilateral pubescence between two angles so constant in *S. media*.

*4. ***S. media*, Linn. DC. Prod. i. 396.** A weak, much-branched annual, glabrous with the exception of a pubescent line down one side of each internode, and a few long hairs on the petioles, and sometimes on the sepals. Leaves ovate, shortly pointed, the lowest on long petioles, short and broad, and sometimes cordate, the upper ones on shorter petioles or quite sessile, $\frac{1}{2}$ to $\frac{3}{4}$ in. long, thin and flaccid. Pedicels slender, often drooping, in the forks of the branches, the upper ones usually forming a rather dense leafy cyme, very rarely one of the lowest axillary from the abortion of one fork. Sepals about 2 lines long, obtuse or rarely rather acute, thin but green, with scarcely prominent nerves, and usually pubescent. Petals about as long, deeply cleft. Capsule scarcely longer than the calyx.—*Reichb. Ic. Fl. Germ. v. t. 222.*

Originating, probably, in the temperate regions of the northern hemisphere in the Old World, this plant is now a common weed in cultivated places, especially gardens, as well as in waste places, almost all over the globe, and as such is found in most of the Australian colonies, especially Victoria, *F. Mueller*, and W. Australia, about Swan River, *Drummond*, n. 244.

5. ***S. multiflora*, Hook. in Comp. Bot. Mag. i. 275.** A slender, glabrous, branching annual, with decumbent or erect stems, usually under 6 in. Leaves sessile, or the lowest petiolate, mostly lanceolate, 2 to 3, or rarely 4 lines long, the upper ones very small. Pedicels axillary, sometimes all shorter than the calyx, in other specimens all filiform but rigid, 3 to 6 lines long. Sepals lanceolate, very acute, about 2 lines long, 3-nerved or strongly 1-nerved. Petals none. Stamens short, those alternating with the sepals often rudimentary or wanting. Capsule as long as or longer than the sepals. Seeds tuberculate. Hook. f. *Fl. Tasm. i. 43*; *F. Muell. Pl. Viet. i. 212.*

Victoria. Sandy, grassy, and rocky localities, not uncommon as well in the lowlands as in the mountain regions, ascending to the Alps, *F. Mueller*.

Tasmania. On grassy dry pastures and rocks, etc., common, *J. D. Hooker*.

S. Australia. Distributed over the southern and eastern parts of the colony, *F. Mueller*. Remarkably luxuriant specimens from Rivoli Bay considerably exceed $\frac{1}{2}$ ft. in length.

W. Australia, Drummond, n. 695.

Arenaria serpyllifolia, Linn.; DC. Prod. i. 411. A very much branched, slender, and slightly pubescent annual, seldom attaining 6 in. Leaves very small, ovate, and pointed. Pedicels from the upper axils or forks, 2 to 3 lines long, and slender. Sepals 5, acute, about $1\frac{1}{2}$ lines long. Petals usually much shorter, white, obovate, entire. Stamens 10. Styles 3. Capsule short, opening in 6 narrow valves.

Common in Europe and temperate Asia, on walls and muddy, stony, or waste places, and now almost naturalized in several of the Australian colonies.

5. *SAGINA*, Linn.

Sepals 4 or 5. Petals as many, entire or scarcely notched, or none. Sta-

mens 8, 10, or fewer. Styles as many as sepals, and alternate with them. Capsule opening to the base into as many valves as styles, alternating with the sepals.—Small matted or tufted herbs, with subulate leaves and small flowers, usually borne on long pedicels.

A small genus, dispersed over the temperate or cooler regions of the northern hemisphere, the commonest species also abundant in the southern hemisphere.

1. ***S. procumbens***, *Linn. DC. Prod.* i. 389. A minute annual or rarely perennial, 1 to 2 in. or rarely 3 in. high, usually branching from the base and decumbent, forming little spreading tufts, glabrous or very minutely pubescent. Leaves small and subulate, joined by a short scarious sheath, the radical ones longer and tufted. Flowers very small, on capillary peduncles longer than the leaves. Sepals 4, about 1 line long. Petals much shorter, often wanting. Valves of the capsule as long as the sepals or rather longer. All these parts usually in fours, but occasionally met with in fives.—*Reichb. Ic. Fl. Germ.* t. 206; *F. Muell. Pl. Viet.* i. 208; *S. apetala*, *Linn.*; *DC. l. c.*; *Reichb. l. c.* t. 200.

Victoria. Morasses and mossy valleys between Mount Sevier and Limestone river, at an elevation of 4000 feet (the perennial form); the common annual form abundant about Melbourne, Port Phillip, etc., *F. Mueller*.

S. Australia. St. Vincent's Gulf, lofty ranges, etc., *F. Mueller*.

Very abundant, in a great variety of situations, over the whole range of the genus.

6. COLOBANTHUS, Bartl.

Sepals 4 or 5. Petals none. Stamens as many as sepals and alternating with them, slightly perigynous. Styles as many as sepals and opposite to them. Capsule opening in as many valves as sepals, and opposite to them.—Small tufted herbs, glabrous and often somewhat fleshy. Leaves narrow, or short and imbricate. Flowers solitary.

A small genus, spread over the mountainous or antarctic regions of South America, Australia, and New Zealand. Both the Australian species are common to New Zealand and Antarctic America. The genus has been referred by Fenzl to *Portulacæ*, on account of the position of the stamens; but all other characters are much more those of *Caryophyllææ*.

Leaves short and spreading. Flowers nearly sessile 1. *C. subulatus*.
Leaves erect or elongated. Pedicels much longer than the calyx 2. *C. Billardieri*.

1. ***C. subulatus***, *Hook. f. Fl. Ant.* i. 13, t. 93, and ii. t. 47. Stems short, with crowded leaves, forming dense moss-like tufts often covering a considerable space of ground. Leaves linear, concave and strongly keeled, with a fine almost pungent point, 2 or rarely 3 lines long, rigid and spreading. Flowers almost sessile within the tufts of leaves, and not exceeding them. Sepals 5, about $1\frac{1}{2}$ lines long, lanceolate, acute and rigid. Capsule nearly as long as the calyx.—*Spergula subulata*, *Durv. Fl. Malouin.* 51, not of Swartz; *Colobanthus Benthamianus*, *Fenzl*, in *Ann. Mus. Vind.* i. 49 (the plate quoted from *Endl. Atakt.* never published); *C. pulcinatus*, *F. Muell.* in *Trans. Phil. Soc. Viet.* i. 201, and *Pl. Viet.* i. 213, t. 11.

Victoria. Bare gravelly summits of the Muanyang mountains, buried the greater part of the year under snow, not occurring below 6000 ft., *F. Mueller*.

The species is also found in New Zealand and in Antarctic America. The New Zealand specimens, and some of those from Campbell's Island, are precisely like the Australian

ous; others have more elongated stems, and less rigid leaves; and the Hermit Island specimens have always 4-merous flowers; whilst in all others they are usually, if not always, 5-merous.

2. **C. Billardieri**, Fenzl, in *Ann. Mus. Vind.* i. 49. A small, densely tufted, almost stemless perennial. Leaves in closely crowded tufts, linear-subulate, sometimes very rigid and not $\frac{1}{2}$ in. long, more frequently 1 in. long or more, somewhat flaccid, 1 line broad and sheathing at the base, and attenuated into a long point, sometimes filiform and grass-like, $\frac{1}{2}$ to 1 in. long. Peduncles 1-flowered from the centre of the leaf-tufts, shorter or longer than the leaves, but always longer than the calyx, slightly thickened under the flower. Sepals 5, broadly lanceolate, very finely pointed, about 2 lines long. Capsule from globular to ovoid, shorter or longer than the calyx. Hook. f. *Fl. Tasm.* i. 45; F. Muell. *Pl. Vict.* i. 212; *Spergula apetalis*, Labill. *Pl. Nov. Holl.* i. 112. t. 142; DC. *Prod.* i. 395; *Spergula affinis*, Hook. *lc.* *Pl.* i. 266; *Colobanthus affinis*, Hook. f. in Hook. *Journ. Bot.* ii. 410, and *Fl. Tasm.* i. 45.

Victoria. Rocky hills near Warnambool, *Hannaford*.

Tasmania, *Labillardière*; Kent's Group, Bass's Straits, *R. Brown*; northern and central parts of the island, alpine districts of the Hampshire hills, and Franklin river, *J. D. Hooker*; Southport, *C. Stuart*.

Two forms have been described, but they pass very much one into the other, the differences in the form of the capsules not corresponding with the variations in the leaves. The species occurs also in New Zealand and in Campbell's Island.

Spergula arcensis, Linn.; DC. *Prod.* i. 394. A slender annual, branching at the base into several erect or ascending stems, 6 in. to 1 ft. high, glabrous or slightly pubescent. Leaves almost subulate, 1 to 2 in. long, in opposite clusters and spreading so as to appear verticillate. Stipules scarious, very minute, sometimes very difficult to see. Flowers small, white, on long pedicels, in terminal forked cymes. Sepals 5. Petals 5, undivided, generally rather shorter than the calyx. Stamens 10, or occasionally 5 or fewer. Styles 5, alternate with the sepals. Capsule deeply 5-valved. Seeds slightly flattened, with or without a scarious border.

Common in Europe and temperate Asia in cultivated and waste places, and now dispersed over various parts of the world as a cornfield weed, and introduced as such into the Australian colonies, especially Swan River, *Drummond*.

7. SPERGULARIA, Pers.

(Lepigonum, Fries.)

Sepals 5. Petals 5, entire or rarely 0. Stamens 10 or fewer. Styles 3. Capsule 3-valved.—Herbs usually diffuse. Leaves linear or filiform, often clustered in the axils so as to appear verticillate. Stipules small, scarious. Flowers pedicellate, pink or white, in the forks of the stem or in terminal cymes or one-sided racemes. Seeds with or without a scarious border.

A small genus, widely dispersed over the temperate or subtropical regions of the globe, chiefly in maritime or saline localities, or heathy places, differing from *Arenaria* almost solely in the presence of stipules. The Australian species is the same as the common northern one.

1. **S. rubra**, Pers. *Syn.* i. 504 (as a subgenus of *Arenaria*). An annual, biennial or rarely perennial, glabrous or with a short viscid pubescence in the upper parts, with numerous stems branching from the base and forming spreading or prostrate tufts 3 or 4 in., or when luxuriant 6 in. long. Leaves narrow-linear, the scarious stipules at the base short but conspicuous.

Flowers very variable in size, usually pink, on short pedicels, in forked cymes, usually leafy at the base. Petals shorter, or rather longer than the sepals. Seeds more or less flattened, often surrounded by a narrow scarious border or wing. *A. Gray*, Gen. III. t. 108; *Hook. f.* Fl. Tasm. i. 41; *F. Muell.* Pl. Vict. i. 207; *Arcturia rubra* and *A. media*, Linn.; DC. Prod. i. 401; *Lepigonia rubra*, etc., Fries, Nov. Pl. Succ. Mant. iii. 32; *L. brevifolia*, Barth. in Pl. Paris. i. 243; *L. anceps* and *L. laeviflora*, Barth. l. c. 244 (of these last I have only seen authentic specimens of *L. anceps*); *Spergularia rupestris*, Fenzl, in Hueg. Enum. 9; Schlecht. in Linnea, xx. 632.

N. S. Wales. Arzyle county and Field's Plains, *A. and R. Cunningham*; New England, *C. Stuart*; Darling river, *Victorian Expedition*.

Victoria. Coast meadows and subalpine tracts of the interior, on clayey and sandy soil, not unfrequent, ascending occasionally into mountainous tracts, *F. Mueller*.

Tasmania. Abundant on the seacoast, *J. D. Hooker*.

S. Australia. Near Adelaide, St. Vincent's Gulf, etc., *F. Mueller*.

W. Australia. *Druce*, *1st Coll.*, 5th *Coll.*, n. 201 and 243, *Pross*, n. 1544, *Oldfield*, and others.

Widely spread over Europe, temperate Asia, and North America, and some parts of South America, chiefly in maritime countries or in sandy heathy places more inland. There are two, often rather marked varieties, one chiefly occurring inland has smaller leaves, small flowers, and short capsules, with the seeds less frequently bordered than in the larger variety, which has a sometimes perennial stock, thicker somewhat fleshy leaves, and larger flowers. Both forms occur in Australia and pass into each other as they do in Europe, the larger and more succulent ones are, however, the most common in Australia.

TRIBE 3. POLYCARPÉE.—Sepals free, or only united by the disk at their base. Petals usually very small, thin and almost transparent or none, occasionally united with the stamens at the base. Stamens 5 or fewer, hypogynous or slightly perigynous. Style single, at least at the base, with 3 or 2 branches or minute teeth.

8. DRYMARIA, Willd.

Sepals 5, herbaceous or scarious on the edge. Petals 5, 2- to 6-cleft. Stamens 5 or fewer, slightly perigynous. Style 3-cleft. Capsule 3-valved. Seeds laterally attached; embryo curved round the albumen.—Herbs usually diffuse, rarely erect, with dichotomous branches. Leaves flat, broad or narrow. Stipules very small, sometimes very fugacious or wanting. Flowers pedicellate, usually small, either solitary in the forks, or in little axillary or terminal cymes. Petals usually shorter than the calyx.

The genus comprises a considerable number of American species, one of which is also widely spread over the tropical regions of Asia and Africa. The Australian species is endemic, and the only one which is not American.

1. **D. filiformis**, *Benth.* A glabrous annual, very much branched at the base, with erect dichotomous very slender shining stems 6 to 8 in. high. Leaves chiefly crowded in a dense tuft at the base of the stem, narrow-linear, almost filiform, many of them above 1 in. long, the upper leaves few and small, soon passing into minute bracts. Stipules none. Pedicels in the forks, filiform, about $\frac{1}{2}$ in. long. Sepals about 1 line long, narrow and acute, green, shortly connate at the base. Petals about one-third as long as the calyx, deeply divided into 2 narrow lobes, very thin and transparent, and often very difficult to find. Ovary oblong, with an exceedingly short style, divided into 3 short

oblong-linear stigmatic branches. Capsule cylindrical, from half as long again to twice as long as the calyx, opening in 3 valves, which soon split into twice that number.

W. Australia, *Drummond, n. 694,*

This is a very distinct plant, with something of the habit of a *Mollugo*, and the inflorescence of *Gypsophila tuberosa*. The structure is that of *Drymaria*, and in that genus it approaches nearest to *D. effusa* and *D. tenella*, A. Gr., from New Mexico, having similar narrow leaves without stipules; but the slender pedicels and cylindrical capsule distinguish it at once.

9. POLYCARPON, Linn.

Sepals 5, keeled, scarious on the margin. Petals 5, small, entire or notched. Stamens 3 to 5. Style short, 3-cleft. Capsule 3-valved. Seeds laterally attached near the base; embryo excentric, curved or nearly straight, the cotyledons incumbent or oblique.—Herbs either diffuse or dichotomously branched, glabrous or pubescent. Leaves flat, usually ovate or oblong, often apparently, but not really, in whorls of 4. Stipules scarious. Flowers small, numerous, in terminal cymes, with scarious bracts.

A genus of very few species, dispersed over the temperate and tropical regions of the globe. The Australian species is identical with the commonest northern one.

1. **P. tetraphyllum**, *Linn. f. ; DC. Prod. iii. 376.* A glabrous, much branched, spreading or prostrate annual, seldom more than 3 or 4 in. long. Leaves obovate or oblong, really opposite, but placed as they usually are under the forks, two pairs are so close together as to assume the appearance of a whorl of 4. Flowers very small and numerous, in loose terminal cymes. Sepals barely 1 line long. Petals much shorter and very thin. Stamens usually 3.—*F. Muell. Pl. Vict. i. 205.*

N. S. Wales. Port Jackson, *R. Brown*, and others.

Victoria. In light soil, widely dispersed over the colony, *F. Mueller.*

Tasmania. Perhaps introduced, *Gunn.*

S. Australia. Near Adelaide, *Herb. Mueller.*

W. Australia, *Drummond* and others.

Very common in sandy situations, chiefly not far from the sea, in Europe, temperate Asia, the greater part of Africa, and in many parts of North and South America; but unknown in tropical or subtropical Asia.

P. alsinifolium, *DC. Prod. iii. 376,* a maritime variety, with thicker succulent leaves and often, but not always, 5 stamens, not uncommon in the Mediterranean region, is given as Australian on the authority of Sieber's specimens, n. 570, which I have not seen, nor have I met with the variety in any Australian collection. All the Port Jackson specimens which I have seen, although maritime, are thin-leaved and 3-androus.

10. POLYCARPÆA, Lour.

(*Aylmeria*, *Mart.*)

Sepals 5, either entirely scarious, or herbaceous in the centre and scarious on the margin, but not keeled. Petals 5, entire or toothed. Stamens 5, hypogynous or slightly perigynous, free or united with the petals in a ring or tube. Style elongated, 3-furrowed, 3-toothed, or shortly 3-lobed at the top. Capsule 3-valved. Seeds obovoid or flattened; embryo curved or nearly straight; cotyledons usually (perhaps always) accumbent.—Annual or peren-

nial herbs, erect or diffuse. Leaves narrow-linear or rarely ovate, often clustered in the axils so as to appear verticillate. Stipules scarious. Flowers usually numerous, in terminal cymes, sometimes loose and paniculate, sometimes dense and capitate, often remarkable for the white, pink or purple scarious sepals and bracts.

The genus is dispersed over the tropical and subtropical regions of the Old World, one, the commonest species, extending also into tropical America. The 9 Australian species are all tropical; one is the above-mentioned common one, another, *P. spicata*, is also Asiatic, the 7 others are endemic.

SECT. 1. **Planchonia**, J. Gay. *Petals and stamens united in a cup or tube, without staminodia.*

Stems hard and almost woody at the base, the radical leaves soon disappearing. Leaves all narrow. Flowers 3 to 4 lines.

Stem tall, pubescent. Corolla-tube shorter than the free part.

Stamens the length of the petals. Capsule short, obtuse . . . 1. *P. longiflora*.

Stems short, glabrous. Corolla-tube longer than the free part.

Stamens much longer than the petals. Capsule oblong, tapering at the top . . . 2. *P. spirostyles*.

Stems herbaceous, several from a rosette of oblong or obovate radical leaves. Stem-leaves narrow. Flowers $1\frac{1}{2}$ to 3 lines . . . 3. *P. synandra*.

SECT. 2. **Aylmeria**, Mart.—*Petals and stamens free or nearly so, with 5 short staminodia inside the petals and opposite to them.*

Sepals purple, glabrous, nearly 3 lines long. Stamens and petals slightly perigynous . . . 4. *P. violacea*.

Sepals white or yellowish, hairy, about 2 lines long. Stamens and petals very perigynous . . . 5. *P. staminodina*.

SECT. 3. **Polycarpia**.—*Petals and stamens free or united in a ring at the base, without staminodia.*

Stems simple or hard and woody at the base. Radical leaves soon disappearing.

Flowers $1\frac{1}{2}$ lines. Petals rounded and very obtuse. Capsule much shorter than the sepals . . . 6. *P. corymbosa*.

Flowers less than 1 line. Petals oval-oblong, acute, or toothed at the top. Capsule rather shorter or longer than the sepals . . . 7. *P. breviflora*.

Stems herbaceous, several from a rosette of oblong or obovate radical leaves.

Flower-heads pedunculate, with scarious bracts . . . 8. *P. spicata*.

Flower-heads closely sessile, surrounded by herbaceous floral leaves . . . 9. *P. involucreata*.

SECTION 1. **PLANCHONIA**, J. Gay, in *Herb. Hook.*—Petals and stamens united in a cup or tube without staminodia. Sepals very scarious, often rather large.

1. **P. longiflora**, F. Muell. in *Rep. Babb. Exped.* 8. Pubescent, erect and rigid, 1 to 2 ft. high, divided at the base into several erect branches. Leaves narrow-linear, acute or ending in a hair-like point, rigid, silky-hairy, often above $\frac{1}{2}$ in. long, with smaller ones clustered in their axils; the upper ones small and distant. Flowers large, brown red or purple, shortly pedicellate in dense terminal corymbose cymes or heads. Sepals fully 3 lines long, scarious, with a prominent midrib, the inner ones narrower, more acute and more deeply coloured than the outer. Petals hypogynous, united with the stamens in a campanulate tube not 1 line long, their free parts considerably

longer and shortly bifid at the point. Filaments about as long as the petals. Ovary almost sessile. Style long and subulate. Capsule short ovoid, obtuse.

N. Australia. Grassy flats along the Victoria river and other parts of Arnhem's Land, *F. Mueller*; N.W. coast, *Bynoe*; Nichol Bay, *Walcott*.

Var. *leucantha*. Leaves larger, broader, and less rigid. Sepals completely scarious and white, without any prominent midrib.—Victoria river, *F. Mueller*.

2. **P. spirostyles**, *F. Muell. in Rep. Babb. Exp.* 8. Glabrous and often very glaucous, woody at the base, with numerous rigid opposite or dichotomous branches, our specimens not exceeding 6 in. Leaves very narrow-linear, the margins revolute so as to be almost terete and filiform, rarely exceeding $\frac{1}{2}$ in., often clustered. Stipules small, with subulate points. Flowers large, on very short pedicels, either few in the upper forks, or forming at length a broad corymbose cyme. Sepals 3 to 4 lines long, acute, white and scarious with a prominent midrib, the outer ones shorter and broader than the inner. Petals and stamens perigynous, united in a tube of fully 2 lines, with the slender filaments projecting considerably beyond the free oblong tops of the petals. Ovary shortly stipitate, tapering into a long spirally twisted deciduous style. Capsule stipitate, oblong, tapering at the top, nearly as long as the sepals. Seeds numerous, very small.

N. Australia. Gilbert's River, *F. Mueller*.

3. **P. synandra**, *F. Muell. in Rep. Babb. Exped.* 8. A glabrous annual, with a rosette of petiolate spatulate or oblong radical leaves. Stems several, erect or decumbent, not above 6 in. high, with dichotomous or clustered branches. Leaves narrow-linear, with recurved or revolute margins, the longer ones above $\frac{1}{2}$ in., but mostly shorter, and not much clustered. Stipules small, with fine points. Flowers rather larger than in *P. corymbosa*, in small rather loose corymbose cymes, all more or less pedicellate, the floral leaves all reduced to scarious bracts. Sepals about 2 lines or nearly 3 lines long in the capitate variety, white and scarious with a prominent midrib often purple. Petals united with the stamens in a tube of about 1 line, their free part shorter and entire, sometimes very short, the filaments about the same length. Ovary sessile, with a subulate style. Capsule oblong, tapering at the top, with few seeds.

N. Australia. Hooker's Creek and Start's Creek, *F. Mueller*.

S. Australia. In the interior at Wirrawirraloo, *Babbage's Expedition*.

Var. (?) *densiflora*. Leaves small and few. Flowers larger, in a dense, nearly globular head of 1 in. diameter. Petals notched.

Queensland. N.E. coast, *A. Cunningham*; Port Denison, *Fitzalan*; Rockhampton, *Thozet*.

Var. *gracilis*. More slender. Sepals about $1\frac{1}{2}$ lines long. Petals rather broad, notched.

N. Australia. Port Essington, *A. Cunningham, Armstrong*.

SECTION 2. AYLNERIA, *Mart.*—Petals and stamens free or nearly so, with 5 short staminodia inside the petals and opposite to them. Sepals very scarious.

4. **P. violacea**, *Benth.* Pubescent, erect and slightly branched, 1 to 2 ft. high. Leaves narrow-linear, flat or concave, $\frac{1}{2}$ to 1 in. long, often clus-

tered in the axils, the upper ones small and distant. Stipules scarious, lanceolate with fine points. Flowers purple, in dense terminal leafless corymbose cymes or heads, more or less pedicellate, the floral leaves all reduced to scarious bracts. Sepals nearly 3 lines long, with a prominent midrib, the outer ones shorter and rather less coloured. Petals free, about $\frac{2}{3}$ as long as the sepals, oblong-lanceolate, obtusely bifid. Stamens about as long as the petals, the filaments filiform, united at the base in a ring, with as many minute filiform staminodia opposite the petals. Style subulate. Capsule short, globular, with few seeds.—*Aylneria violacea* and *A. rosea*, Mart. in Nov. Act. Nat. Cur. xiii. 277; *Achyranthes violacea*, Spreng. Syst. Cur. Post. 102, and *A. rosea*, Spreng. l. c. 103.

N. Australia. Croker's Island, *A. Cunningham*; Port Essington, *Armstrong*.

5. **P. staminodina**, *P. Muell. in Rep. Babb. Exp. 8.* Pubescent, with erect, opposite or sometimes clustered branches, $\frac{1}{2}$ to 1 ft. high. Leaves narrow-linear or the lower ones linear-lanceolate, flat, the larger ones $\frac{1}{2}$ to $\frac{3}{4}$ in., with smaller ones clustered in their axils. Stipules with long subulate points. Flowers larger than in *P. corymbosa*, in terminal cymes or heads, forming an irregular general corymb; the floral leaves all reduced to scarious bracts. Sepals about 2 lines long, scarious and pubescent, white or slightly yellowish, without any prominent midrib. Petals almost free, inserted with the stamens on a thickened perigynous disk, lanceolate, entire, rather more than half the length of the sepals. Stamens about as long, alternating with short filiform staminodia opposite the petals. Ovary short, with a rather short style. Capsule small, sessile or shortly stipitate, with few seeds.

N. Australia. Sources of the Victoria river, Hooker's Creek and Sturt's Creek, *P. Muell.*

SECTION 3. POLYCARPIA.—Petals and stamens free or united in a ring at the base. Sepals entirely or partially scarious.

6. **P. corymbosa**, *Lam. Illustr. n. 2798.* Minutely pubescent or rarely almost glabrous, with erect, rather slender, but stiff branches, $\frac{1}{2}$ to 1 or even $1\frac{1}{2}$ ft. high. Leaves from narrow-linear to almost subulate, rarely linear-lanceolate, flat or with revolute margins, the longer ones $\frac{1}{2}$ to 1 in., with small ones clustered in their axils, the upper ones much smaller and often few and distant. Stipules tapering to a fine point. Flowers numerous, in dense terminal corymbose cymes, sometimes all forming one dense mass on the top of an otherwise simple stem, sometimes the cymes numerous and loosely paniculate. Floral leaves all reduced to scarious bracts. Sepals about $1\frac{1}{2}$ lines long, white and scarious, without any prominent midrib, but tapering to a fine point. Petals quite free, not $\frac{1}{2}$ line long, broadly ovate, very obtuse and rather firm. Stamens often shorter. Style very short. Capsule ovoid or oblong, much shorter than the sepals.—DC. Prod. iii. 374; Wight, Ic. Pl. Ind. Or. t. 712.

N. Australia. N. coast, *R. Brown*; Victoria river and Albany Island, *E. Muell.*; Lizard Island, Keppel's Island, and Port Curtis, *M'Gillivray*.

The species is common in tropical Asia and Africa, and is found also in Brazil and Guiana.

7. **P. breviflora**, *F. Muell. in Rep. Babb. Exp. 9.* Glabrous or pubes-

cent, and very nearly allied to *P. corymbosa*, but more slender and divaricately branched, and at once known by its very much smaller flowers. Sepals scarcely 1 line long, broader and less acuminate than in *P. corymbosa*, petals much narrower, not so obtuse and usually denticulate at the top; stamens much more perigynous; capsule longer in proportion, occasionally even exceeding the sepals.

N. Australia. N. coast, *R. Brown*; Gulf of Carpentaria, *P. Mueller*.

Queensland. Islands of Moreton Bay, *F. Mueller*; Rockhampton, *Thozet*.

8. ***P. spicata*, *Ara. in Ann. Nat. Hist.* iii. 91.** A small glabrous annual, seldom attaining 6 in. and often not half that size. Radical leaves rosulate, obovate or oblong, on long petioles. Stems several, decumbent or erect, with few spreading dichotomous or clustered slender branches. Leaves under the branches in small false whorls, spatulate or obovate-oblong, 2 to 3 lines long, including the petiole. Stipules short, broadly scarious, with a fine point. Flowers small, white, in small dense terminal cymes or heads, the floral leaves all reduced to short obtuse scarious bracts. Sepals rather more than 1 line long, scarious, the outer one with a broad thick centre, the others with a narrow slightly thickened midrib. Petals very minute and subulate, almost free from the short stamens. Style short. Capsule small, nearly globular.—Wight, *lc. Pl. Ind. Or. t.* 310; *P. stulticeformis*, *Steud. Nom. ed.* 2, ii. 369.

N. Australia. N.W. coast, *Bynoe*.

The species ranges over the sandy districts of Arabia and the East Indian Peninsula.

9. ***P. involucrata*, *F. Muell. in Rep. Bobb. Exped.* 9.** Pubescent, with numerous erect or decumbent rigid dichotomous stems of 2 to 4 in. or rarely twice that length. Radical leaves rosulate, oblong or nearly obovate, narrowed into long petioles; stem-leaves more sessile, narrow-oblong or lanceolate, rather rigid, obtuse or the upper ones acute, 2 to 4 lines long, the floral ones in false whorls of 4 to 8. Flowers several together in sessile heads, in the forks or at the ends of the branches, rarely exceeding the herbaceous floral leaves. Sepals white, finely pointed, 2 to near 3 lines long; the outer ones thickened and cartilaginous at the base. Petals oblong, about $\frac{1}{2}$ the length of the sepals, slightly united with the stamens in a ring at the base. Style very short, with a capitate slightly furrowed stigma. Capsule small, ovoid-globular.

N. Australia. Hooker's Creek, Sturt's Creek, and near the sources of the Victoria river, *P. Mueller*.

ORDER XVII. PORTULACÆÆ.

Flowers regular, hermaphrodite. Sepals fewer than petals, usually 2, free or rarely adnate to the ovary at the base, usually broad, imbricate in the bud. Petals 4 or 5, rarely more, hypogynous or rarely perigynous, imbricate in the bud. Stamens inserted with the petals and often adhering to their base, of the same number or fewer and opposite to them or indefinite; anthers 2-celled. Ovary free or rarely half-inferior, 1-celled. Style more or less deeply divided into 3 or rarely 2 or more than 3 branches, stigmatic along the inner side. Ovules 2 or more, amphitropous, with an inferior micropyle, attached to funi-

cles erect from the base of the cavity, and free or united in a central column, or in as many clusters as style-branches. Seeds several or solitary by abortion, usually more or less reniform, with a lateral hilum; testa crustaceous, sometimes with a caruncle at the hilum. Embryo more or less curved round the mealy albumen, or rarely nearly straight with very little albumen.—Herbs rarely shrubby at the base, usually glabrous and succulent or clothed with long hairs. Leaves alternate or opposite, entire. Stipules scarious or split into hairs or none. Flowers terminal and solitary, or in racemes cymes or panicles, or rarely axillary. Petals usually very fugacious or withering in a mass.

A small Order, chiefly American, with a few species dispersed over other parts of the world, especially S. Africa and Australia. The Australian genera are none of them endemic, 2 of them being chiefly American, and the other 2 generally distributed over the globe. The chief characters, derived from the ovary and seeds, are those of *Caryophylleæ*, from which *Portulacæ* differ in habit, in the number and position of the stamens, and especially in their calyx.

- Ovary half-inferior. Petals and stamens perigynous 1. PORTULACA.
 Ovary superior. Petals and stamens hypogynous.
 Petals free.
 Stamens 5, opposite the petals, and inserted on their base 3. CLAYTONIA.
 Stamens indefinite, often numerous, rarely and irregularly reduced
 to 5 2. CALANDRINIA.
 Petals united in a simple corolla, split open on one side. Stamens
 3 to 5 4. MONTIA.

1. PORTULACA, Linn.

Sepals 2, united at the base in a tube adnate to the ovary, the free part deciduous. Petals 4 to 6, perigynous. Stamens indefinite, often numerous, sometimes 6 to 8, inserted with the petals. Ovary half-inferior, with several ovules. Style deeply 2- to 8-cleft. Capsule membranous, half-inferior, the free part circumsciss at maturity. Seeds reniform, shining, often granulate. — Herbs more or less succulent. Leaves alternate or opposite, often clustered in the axils, the floral ones usually forming an involucre round the flowers. Stipules scarious, or more frequently reduced to a tuft of hairs, sometimes very minute or none. Flowers terminal, sessile, or pedicellate.

The species are mostly American, with a very few tropical Australian, Asiatic, or African ones, 2 of them widely dispersed over cultivated or sandy places in various parts of the globe. One of these is included among the Australian ones, of which the remainder are all endemic.

Leaves mostly alternate.

Stipular hairs minute or none.

- Leaves oblong-cuneate. Root slender. Capsule closely sessile 1. *P. oleracea*.
 Leaves linear-terete. Root usually tuberous. Capsule narrowed
 into a short stipes 2. *P. napiformis*.

Stipular hairs numerous and conspicuous.

- Leaves thick and short 3. *P. australis*.
 Leaves linear-terete, almost filiform 4. *P. filifolia*.

Leaves all opposite.

- Stipular hairs short, but conspicuous. Flowers usually 3, within
 the floral leaves, and shortly pedicellate. Style-lobes subulate 5. *P. digyna*.

No stipular hairs. Flowers solitary and sessile, within 4 bract-like floral leaves. Style-lobes flat and transparent.

Leaves lanceolate or linear 6. *P. oligosperma*.
Leaves orbicular 7. *P. bicolor*.

1. **P. oleracea**, *Lim.*; *DC. Prod.* iii. 353. A low, prostrate, or spreading annual, seldom exceeding 6 in., somewhat succulent, and quite glabrous. Leaves mostly alternate, cuneate-oblong, obtuse, very rarely exceeding $\frac{1}{2}$ in., usually narrowed into a short petiole, the stipular hairs very minute, and sometimes quite disappearing. Flowers terminal and sessile, between 2 or more floral leaves, rarely solitary, usually several together in little heads which are either single or several in a dichotomous cyme. Sepals not much more than 2 lines long. Petals 5, scarcely longer than the calyx, slightly united at the base, yellow and very fugacious. Stamens 10 to 12 or rarely fewer. Style short, with 5 linear stigmatic lobes. Capsule sessile. Seeds minutely tuberculate, the panicles often united at the base into 5 clusters.—*A. Gray*, *Gen. III.* t. 99; *F. Muell.* in *Rep. Babb.* Exped. 10.

N. Australia. Victoria river, *F. Mueller*.

Queensland. In the interior, *Mitchell*.

N. S. Wales. Port Jackson, *R. Brown*.

Victoria. Sandy banks of Snowy River, *F. Mueller*.

S. Australia. Elizabeth Creek, in the interior, *Babbage's Expedition*.

Var. δ *grandiflora*. Sepals more obtuse, 3 to 4 lines long.—*Sturt's Creek*, *F. Mueller*.

The species is common in maritime or sandy localities in most tropical countries, extending into the warm parts of the temperate regions, both of the northern and southern hemispheres.

2. **P. napiformis**, *F. Muell. Herb.* Glabrous, with decumbent or erect stems of 6 in. to near 1 ft., the tap-root thickening into an oblong tuber. Leaves alternate, linear, succulent, apparently terete, $\frac{1}{2}$ to 1 in. long. Stipular hairs exceedingly minute. Flowers smaller than in *P. oleracea*, usually 3 together, between 2 to 4 involueral leaves, but not quite sessile. Stamens about 16. Style rather long, 4-cleft at the top. Capsule small, contracted into a short stipes. Seeds smaller than in *P. oleracea*, black and shining, finely granulated.

N. Australia. Victoria river and Beagle Valley, *F. Mueller*; N.W. coast, *Bynoe*.

The species is allied to the East Indian *P. tuberosa*, Roxb., but the flowers and fruits are much smaller, not so closely sessile, and there are not the long stipular and involueral hairs of that species.

3. **P. australis**, *Endl. Atakta*, 7, t. 6. Apparently decumbent and much branched, the stipular and involueral hairs copious, but otherwise glabrous. Leaves alternate, oblong, elliptical, thick, under $\frac{1}{2}$ in. long. Flowers yellow, 1 or 2 together, sessile between 2 to 4 involueral leaves. Stamens numerous. Style elongated, 5- or 6-cleft. Seeds shining, granulate, the funicles united into as many clusters as styles.

N. Australia. Gulf of Carpentaria, *Bauer*.—I have seen no authentic specimens, and have taken the above character from Endlicher's description and Bauer's drawing. A specimen of *F. Mueller*'s may be the same plant, and perhaps one of *R. Brown*'s from Broad Sound, but neither are sufficient for determination. It is not improbable that both this species and *P. filifolia* may prove to be forms of the tropical African *P. foliosa*.

4. **P. filifolia**, *F. Muell. Fragm.* i. 169. Annual, with erect or decum-

bent stems of $\frac{1}{2}$ to 1 ft., the stipular and involueral hairs long and copious, but otherwise glabrous. Leaves alternate, linear-terete, almost filiform, $\frac{1}{2}$ to 1 in. long. Flowers rather large, yellow, 1 to 3 together, sessile between 2 to 4 involueral leaves. Sepals 2 to 2 $\frac{1}{2}$ lines, and petals twice as long. Stamens numerous. Style elongated, usually 4-cleft. Seeds shining, granulate, the funicles united in as many clusters as styles.

N. Australia. Sandy deserts on Sturt's Creek, *F. Mueller*.

Queensland. In the interior, *Mitchell*.

This may be a variety of *P. australis*, and only appears to differ from the tropical African *P. foliosa* in its more slender leaves, and from *P. tuberosa*, Roxb., in the roots not tuberous and in the large flowers.

5. ***P. digyna*, F. Muell. Fragm. i. 170.** A procumbent, glabrous annual of a few inches, with dichotomous or opposite branches. Leaves all opposite, ovate obovate or nearly orbicular, 2 to 3 lines long, very shortly petiolate. Stipular hairs very short. Flowers pink, very small, pedicellate, 1 to 3 together, between 2 or 4 involueral leaves, forming dichotomous leafy cymes. Sepals not 2 lines long. Petals 4, rather longer. Stamens about 10. Style long, with 2 long linear stigmatic branches. Ovules about 6, the funicles forming 2 clusters. Capsule elongate-conical, covered in the upper part with oblong papillæ. Seeds 1, 2, or 3, black, smooth, and shining.

N. Australia. Upper Victoria river, Hooker's Creek, and Sturt's Creek, *F. Mueller*.

6. ***P. oligosperma*, F. Muell. Fragm. i. 170.** A little slender annual of 2 or scarcely 3 in., with numerous opposite branches. Leaves all opposite, oblong, narrow-lanceolate or linear and semiterete, 3 to 4 lines long. Stipular hairs none or quite microscopic. Flowers very small, pink, terminal, solitary and closely sessile within 2 or 4 involueral leaves, which do not exceed the calyx-tube, so that the flower appears pedicellate, with 4 calyx-like bracts at the summit of the pedicel. Sepals scarcely 1 line long, and the petals apparently not longer. Stamens about 6, the anthers very transparent. Style divided into 2 to 4 lanceolate, transparent, and very delicate lobes. Seeds few, black, granulate.

N. Australia. Victoria river and Sturt's Creek, *F. Mueller*.

The Sturt's Creek specimens have smaller and rather broader leaves, and in the flower I examined the lobes of the style were broader than in those from Victoria river, but both are probably forms of one species, nearly allied to the East Indian *P. quadrifida*, but at once known by the absence of stipular hairs.

7. ***P. bicolor*, F. Muell. Fragm. i. 171.** A minute, prostrate annual, with opposite branches, rarely above $1\frac{1}{2}$ in. long. Leaves all opposite, broadly ovate or orbicular, scarcely exceeding 2 lines. Flowers as in *P. oligosperma* minute, solitary, terminal, and closely sessile between 4 bract-like floral leaves (appearing pedicellate, with 4 calyx-like bracts at the summit of the pedicel). Sepals not 1 line long. Petals minute, yellow. Stamens about 6. Style with 4 (or sometimes 2?) lanceolate, transparent, very delicate lobes. Capsule short, broad. Seeds several, small, black, granulate.

N. Australia. Victoria river, *F. Mueller*.

Queensland. Keppel Bay, *R. Brown*.

2. CALANDRINIA, H. B. and K.

Sepals 2, persistent or rarely deciduous. Petals 5 or more, or rarely fewer, hypogynous. Stamens indefinite, numerous or few, free or united in a ring at the base, or adhering to the petals. Ovary free, with several ovules, rarely reduced to 1 or 2. Styles 3 or rarely 4, free or united in a single style, 3- or 4-cleft, or furrowed at the top. Capsule globose, ovoid or oblong, opening in 3 or 4 valves, or almost indehiscent. Seeds reniform-globular or flattened, not strophiolate, shining or granulate. Embryo curved round the albumen. —Herbs, rarely half-shrubby at the base, glabrous or hirsute. Leaves alternate or in radical tufts, more or less fleshy. Stipules none. Flowers either solitary pedunculate and axillary, or arranged in terminal racemes or heads. Petals usually very fugacious.

A large genus, which besides numerous tropical, subtropical, or southern American species, only contains the Australian ones here described, which are all endemic. Formerly confounded with *Talinum*, it has been well distinguished from that genus chiefly by the absence of any strophiola or caruncle to the seeds, and differs from *Claytonia* in the stamens always indefinite, even when reduced to a number about the same as or fewer than that of the petals.

Stamens numerous (20 to 100).

Scapes leafless, several-flowered, with numerous opposite scarious
scales. Root tuberous 1. *C. Lehmanni*.

Scapes leafless, 1-flowered. Leaves radical, narrow-linear 2. *C. uniflora*.

Stems more or less leafy, several-flowered.

Perennial. Petals very broad. Anthers linear-oblong. Styles
united at the base 3. *C. balonensis*.

Annuals. Petals oval-oblong. Anthers short. Styles free to
the base.

Styles and capsular valves 3 4. *C. polyandra*.

Styles and capsular valves 4 5. *C. quadrivalvis*.

Stamens few Capsule ovoid or oblong, very readily dehiscent.

Stamens mostly 8 to 10. Seeds pitted (except in *C. liniflora*).

Sepals acute or scarcely obtuse. Leaves linear-terete, the radical
ones elongated.

Sepals fully 2 lines. Anthers linear-oblong. Seeds smooth and
shining 6. *C. liniflora*.

Sepals 1 to 1½ lines. Anthers small, ovate. Seeds minutely pitted.

Petals 5 7. *C. gracilis*.

Petals about 8 8. *C. polypetala*.

Sepals broad and very obtuse. Leaves oblong or shortly linear.

Stems short, ascending or diffuse 9. *C. pusilla*.

Stems twining 10. *C. volubilis*.

Stamens mostly 3 to 5. Seeds very smooth and shining.

Bracts leafy. Sepals 3 to 4 lines long *C. caulescens* (p. 175).

Bracts very small. Sepals under 2 lines and often under 1 line.

Leaves oblong or linear-oblong, thick. Racemes loose. Pedicels
at length 3 to 5 lines, reflexed 11. *C. calyptrata*.

Leaves small, narrow-linear. Racemes short and very numerous.

Pedicels not 1 line, erect. Flowers very small.

Capsule oblong, with 4 to 8 seeds. Ovules 6 to 8 12. *C. composita*.

Capsule narrow-cylindrical, with 1 or 2 seeds. Ovules 2 13. *C. corrigioloides*.

Stamens few. Capsule globular or shortly ovoid, very smooth and
shining, and scarcely dehiscent.

Leaves linear-terete. Stamens about 15. Anthers oblong.

Capsular valves separating at the base 14. *C. spergularina*.

Leaves linear-terete. Stamens about 5. Anthers globular.

Capsule indehiscent 15. *C. granulifera*.

Leaves short and broad. Stamens 5 to 10. Anthers globular.

Capsule scarcely dehiscent 16. *C. pygmæa*.

1. **C. Lehmanni**, *Endl. in Pl. Preiss.* ii. 235. Rootstock slender and cylindrical, bearing, when full grown, one or more tubers at the base, and at the top a few small scales, apparently the remains of leaves, and a tuft of 2 to 4 erect, slender stems, 6 to 8 in. high and quite leafless, except a number of small, opposite, sheathing scales, their fine points closely pressed against the stem. Leaves in the very young specimens radical, small, obovate, or spatulate, soon withering away, and never more than 2 or 3. Flowers few, in a terminal raceme, the slender pedicels of $\frac{1}{4}$ to $\frac{1}{2}$ in. proceeding from the axils of the upper scales. Sepals very broad, almost obtuse, very thin, 3-nerved, about 2 lines long. Petals nearly 3 times as long. Stamens short, very numerous, with short anthers. Style simple at the base, with 3 long, linear, stigmatic branches. Capsule ovoid, longer than the calyx, 3-valved, with numerous small granulated seeds.

W. Australia. Swan River, *Preiss.* n. 1528, *Drummond*, *Coll.* 1814, n. 242; South Hutt river, *Oldfield*.

2. **C. uniflora**, *F. Muell. in Trans. Phil. Inst. Vict.* iii. 41, and *Fragm.* i. 177. Rootstock simple, cylindrical, erect, bearing a dense tuft of narrow-linear leaves of 2 to 4 in. Scapes numerous from amongst the leaves, 8 to 10 in. high, 1-flowered and leafless, except 1 or 2 minute scales. Flowers rather large. Sepals broad and thin, 3 to 4 lines long. Petals usually 6 or 7. Stamens very numerous, the inner ones much longer than the outer, anthers oblong. Styles 4, erect, shortly plumose and stigmatic along their whole length. Capsule about as long as the sepals, 4-valved. Seeds numerous, black and shining.

N. Australia. Victoria river, near the main camp, *F. Muell.*

The species is nearly allied to two Chilian ones, *C. rostrata*, Barn., and *C. graminifolia*, Philippi.

3. **C. balonensis**, *Lindl. in Mitch. Trop. Austr.* 148. Apparently perennial, erect, branching, 6 in. to 1 ft. high or rather more. Leaves thick and fleshy, the lower ones oblong-spatulate or obovate, 1 in. long or less, the upper ones linear or lanceolate, often above 2 in. Flowers large, purple, in loose terminal racemes, on pedicels of about 1 in. Bracts scarious, acuminate, mostly opposite, but only one of each pair has a flower in its axil. Sepals very broad and obtuse, herbaceous, obscurely veined, with a scarious margin. Petals very broadly obovate, fully $\frac{3}{4}$ in. long. Stamens very numerous; anthers narrow-oblong. Style 3-lobed, the lobes thick and nearly twice as long as the entire base.

Queensland. Sandy soil on the Balonne river, *Mitchell*.

4. **C. polyandra**, *Benth.* Annual, with decumbent or ascending branches of 6 in. to 1 ft. Leaves few, chiefly in the lower part of the stem, thick and fleshy, the lowest broadly linear or almost spatulate, the upper ones narrow-linear, occasionally almost opposite, mostly 1 to $1\frac{1}{2}$ in. long.

Flowers of a red-purple, rather large, few together in a terminal raceme, the pedicels 1 in. or more. Bracts small and scarious. Sepals very broad, rather obtuse, thin and slightly coloured, with scarcely prominent veins. Petals narrow-obovate, about $\frac{1}{2}$ in. long. Stamens very numerous, irregularly united at the base; anthers short. Style divided to the base into 3 linear stigmatic branches. Capsule ovoid or oblong, 3-valved. Seeds very numerous and small, black, minutely pitted.—*Talinum polyandrum*, Hook. Bot. Mag. t. 4833.

S. Australia. Spencer's Gulf, *Warburton*; in the interior, *Victorian Expedition*.

W. Australia, *Burges*, *Drummond*, Coll. 1848, n. 119; Flinders Bay, *Collie*; near *Banbury*, *Oldfield*; *Murchison* river, *Sandford*; W. coast, *Bynoe*.

Var. *leptophylla*. Slender, with very narrow leaves 2 to 3 in. long, and few, rather large flowers on long slender pedicels. W. coast, with the commoner form, *Bynoe*.

5. **C. quadrivalvis**, *F. Muell. Fragm.* i. 176. A glabrous annual, with small, oblong-spathulate radical leaves, soon disappearing, and several decumbent or ascending stems, from a few in. to 1 ft. or rather more, and sometimes much branched. Stem-leaves from linear-spathulate to oblong or lanceolate, narrowed into a petiole, the lower ones often above 1 in. long, the upper ones few and small. Flowers small, pink, in loose racemes sometimes branching into panicles; pedicels $\frac{1}{2}$ to $\frac{3}{4}$ in. Bracts very small, herbaceous or slightly scarious. Sepals herbaceous, acute, about $1\frac{1}{2}$ lines long. Petals 6, fully twice as long as the calyx. Stamens numerous, with small anthers. Style divided to the base into 1 linear stigmatic branches. Capsule about as long as the calyx, 4-valved, with numerous small seeds minutely pitted.

N. Australia. Sandy places along the Victoria river and in the Macadam range, *F. Mueller*.

6. **C. liniflora**, *Fenzl, in Hueg. Enum.* 52. A slender annual, with a tuft of narrow-linear radical leaves of 1 to 2 in. Stems several, ascending, from a few in. to nearly 1 ft. high. Leaves few, linear, mostly small. Flowers apparently red, in a loose raceme, on pedicels of $\frac{1}{2}$ to 1 inch. Bracts small and narrow, but not scarious. Sepals broadly ovate, herbaceous, acute, 2 lines or rather longer. Petals 5, obovate, fully $\frac{1}{2}$ in. long. Stamens about 10, united at the base in a membranous cup; anther-cells linear, only united by a small connective in the centre. Styles or style-branches linear, very shortly united at the base. Capsule oblong, longer than the calyx, with numerous small, smooth and shining seeds.—*Nees, in Pl. Preiss.* i. 247.

W. Australia. Swan River, *Preiss, n.* 1952, *Drummond*.

Var. (?) *grandiflora*. Stems more leafy, flowers larger. Vasse river, *Mrs. Molloy*.

7. **C. gracilis**, *Benth.* A slender annual, with a tuft of narrow-linear radical leaves of 1 to 2 in., and several stems of about 1 ft., bearing few linear leaves and a loose raceme, as in *C. liniflora*, but the flowers are smaller and different in structure. Bracts minute and scarious. Sepals a little more than 1 line long, acute, thin. Petals 5, narrow, about twice as long as the sepals, apparently white. Stamens about 10, the filaments slightly dilated towards the base, but not united; anthers small. Styles divided to the base into 3 or 4 linear stigmatic branches. Capsule rather longer than the calyx, 3- or 4-valved. Seeds very minutely pitted when seen under a strong lens.

N. Australia. Port Essington, *Armstrong*.

8. **C. polypetala**, Fenzl, in Hueg. *Enana*. 51. A slender annual, with filiform radical leaves of 1 in. or longer. Stems ascending, simple, 3 to 6 in. high. Leaves filiform, the upper ones passing into the minute bracts. Racemes terminal, with distant, small flowers, the lower pedicels about 5 lines, the upper ones much shorter. Sepals rather obtuse, a little more than 1 line long. Petals 8 to 10, oblong, twice as long as the sepals, withering into a calyptra, as in *C. calyptrata*. Stamens 8 to 10, united in a ring at the base; anthers globular. Styles 3, filiform. Capsule half as long again as the calyx, nearly cylindrical, 3-valved, with minute, globular, black seeds, minutely granulated. Nees, in Pl. Preiss. i. 247, excluding the var. *composita*.

W. Australia. Swan River, Huegel. I have not seen Huegel's specimens nor any others which I can refer with certainty to Fenzl's *C. polypetala*. It may possibly be the same as *C. pusilla*, but I have never seen in that species more than six petals.

9. **C. pusilla**, Lindl. in Mitch. *Trop. Austr.* 360. A small annual, the stems ascending from 1 to 3 or 4 in. or rarely higher. Leaves radical or on the lower part of the stem, about $\frac{1}{2}$ to 1 in. long, much more succulent than in *C. calyptrata*, oblong or linear, mostly petiolate, but dilated and stem-clasping at the base. Racemes occupying a great part of the stems, but loose and few-flowered, with minute scarious bracts, except the lower ones, which are sometimes leafy. Flowers apparently pink, like those of *C. calyptrata*, except that the sepals are very broad and obtuse, coloured with scarious margins, attaining $1\frac{1}{2}$ lines when in fruit. Petals 5 or 6, oblong. Stamens 5 to 8; anthers small. Style divided to the base into 3 short, thick, stigmatic branches. Capsule narrow, longer than the calyx, opening in 3 valves. Seeds numerous, much smaller than in *C. calyptrata* and minutely pitted.

Queensland. On the Maranoa, Mitchell.

N. S. Wales. Darling river, *Victorian Expedition*.

Victoria. On the Murray, F. Mueller; Wimmera river, Dallachy.

S. Australia. Mount Brown, Holdfast Bay, etc., F. Mueller.

W. Australia. Swan River, Drummond; Murchison river, Oldfield.

This and the following species are united by F. Mueller with *C. calyptrata*, but the differences in habit, calyx, and seeds appear to me to be too constant not to admit them as species.

10. **C. volubilis**, Benth. Allied to *C. pusilla*, and with that species considered by F. Mueller as a variety of *C. calyptrata*, but the seeds and flowers are different. Leaves crowded on a short, succulent, branching stock, linear-oblong, 1 to $1\frac{1}{2}$ in. long, narrowed below the middle, but dilated at the base. Flowering branches twining, almost leafless, except minute scarious bracts. Pedicels flexuose, 2 to 6 lines long. Sepals very obtuse, broad and succulent, $1\frac{1}{2}$ lines when in flower, 2 lines when in fruit. Petals about as long, withering into a calyptra on the young fruit. Stamens 8 to 10, the filaments slightly dilated at the base, but scarcely united; anthers small. Style cleft almost to the base into 3 linear stigmatic branches. Capsule acuminate, twice as long as the sepals. Seeds strongly pitted.

N. S. Wales. Near the Darling river, Beckler.

S. Australia. Port Lincoln, *Wilhelmi*.

11. **C. calyptrata**, Hook. f. in Hook. *lc.* Pl. t. 296. A small annual,

with petiolate linear-oblong or linear-spathulate radical leaves. Stems branching, prostrate or ascending, from 1 or 2 to 7 or 8 in. long. Leaves few, smaller than the radical ones, varying from linear to almost obovate. Flowers very small, in a loose flexuose raceme, the pedicels 2 to 6 lines long, reflexed after flowering. Bracts very small, the upper ones often scarious. Sepals acute, about 1 line long in flower, nearly 1½ when in fruit. Petals about as long, often persistent a long time after flowering, withered into a small calyptra on the top of the young fruit. Stamens about 5, with slender, free filaments; anthers ovate. Style very short, with 3 very short, oblong, stigmatic branches. Capsule rather longer than the calyx, 3-valved. Seeds numerous, small, very smooth and shining. — *Hock. Fl. Tasmania*, i. 143; *Claytonia calyptrata*, F. Muell. *Frngm.* iii. 89.

N. S. Wales. Port Jackson, R. Brown.

Victoria. In the Wendu Valley, Robertson.

Tasmania. Port Dalrymple, R. Brown; on basaltic rocks, near Launceston, Gunn.

S. Australia. Holdfast Bay, Mount Park r. Beale and Banksia ranges, F. Mueller.

W. Australia. King George's Sound, R. Brown, Baxter; S. coast?, *Obliquet*.

Var. (♀) *pumila*, F. Muell. A small, tufted plant, with a thick, succulent root. Leaves radical or nearly so, oblong or almost ovate, 3 to 4 lines long, but narrowed into a petiole twice that length. Flowering branches or racemes loose, 1 to 1½ in. long. Bracts small, scarious. Flowers about the size of the *C. calyptrata*, but the sepals very obtuse. Capsule ovoid-globular, the valves cohering at the summit. Seeds numerous, small, smooth, and shining.

Queensland. Balonne river, Bowman.

N. S. Wales. From Nangawera to Yellowinchi, *Victorian Expedition*. I am inclined to think that further specimens will prove this to be a distinct species (*fl. F. Mueller*).

C. caulescens, H. B. and K. *Nov. Gen. et Sp.* vi. 78, t. 526, a common Peruvian weed, has established itself in waste places about Adelaide and other parts of S. Australia. Although technically the characters are nearly those of *C. calyptrata*, it is readily known by its much more leafy stems, the bracts all leaf-like, and the flowers more than twice the size, the sepals ovate, acuminate, 3 or 4 lines long. *C. compressa*, Schrad. (*C. palustrioides*, DC.), an equally common Chilian weed, is also very nearly allied, but is readily distinguished by the very broadly hastate sepals, as well as some differences in the foliage.

12. **C. composita**, Nees (under *C. polypetala*). A small diffuse annual, very densely branched, seldom exceeding 2 or 3 in. Radical leaves linear, attaining ½ in., the stem-leaves mostly 1 to 2 lines, passing into minute bracts. Flowers very small and numerous, in short racemes on pedicels rarely exceeding 1 line, and usually much shorter when in flower. Sepals ¾ line in flower, 1 line long when in fruit, obtuse and rather thick. Petals 5 or 6, scarcely exceeding the calyx, withering into a calyptra as in *C. calyptrata*. Stamens 3 to 5; anthers small. Style divided to the base into 3 linear stigmatic branches. Ovules about 6 to 8. Capsule ovoid-oblong, longer than the calyx, opening in 3 valves. Seeds 3 to 6, smooth and shining. — *C. polypetala*, var. *composita*, Nees, in *Pl. Preiss.* i. 247.

W. Australia. Swan River, Drummond, *Preiss.* n. 1951.

13. **C. corrigioloides**, F. Muell. *Herb.* An annual, with narrow-linear radical leaves contracted into a long petiole. Stems numerous, prostrate or slightly ascending, not much exceeding ½ ft. Stem-leaves few, linear, petiolate. Racemes numerous, short, axillary and terminal, branching

so as to form little unilateral cymes. Bracts minute. Flowers very small, white, on pedicels which rarely exceed $\frac{1}{2}$ line. Sepals not $\frac{1}{2}$ line long, obtuse. Petals 5 or 6, narrow, rather longer than the sepals. Stamens usually 3; anthers small. Style divided into 3 very short stigmatic lobes. Ovules usually 2. Capsule cylindrical, slender, often above $1\frac{1}{2}$ lines long, opening in 3 valves. Seed usually only 1, or rarely 2, in the base of the capsule, large in proportion, orbicular, black, and very smooth and shining.

Victoria. Wimmera river, *F. Mueller*.

W. Australia. Swan River, *Drummond*; Canning and Murchison rivers, *Oldfield*.

14. **C. spergularina**, *F. Muell. Fragm.* i. 175. A small annual, with a tuft of linear-terete leaves under 1 in. long. Stems slender, decumbent, slightly branched, 2 to 4 in. long or scarcely more. Leaves few, small, linear-terete. Flowers pink, very small, in a rather rigid often flexuose raceme on pedicels of 1 to 3 lines. Bracts very minute and scarious. Sepals acute, a little more than 1 line long in flower, $1\frac{1}{2}$ lines when in fruit. Petals 6, not twice as long as the calyx. Stamens about 15; anthers oblong, the cells adhering in the centre only. Style divided to the base into 3 linear stigmatic branches. Capsule small, the valves remaining coherent at the top, separating at the base, and falling off together. Seeds small, smooth, and shining.

W. Australia. Sandy bed of Nicholson river, Gulf of Carpentaria, *F. Mueller*.

15. **C. granulifera**, *Benth.* A small annual, with a tuft of linear radical leaves. Stems numerous, rigid, branching, decumbent or ascending, 2 to 6 in. long. Leaves few and small. Bracts very minute. Flowers very small, in terminal one-sided racemes, on rigid pedicels of 1 or rarely 2 lines, much thickened when in fruit. Sepals little more than $\frac{1}{2}$ line long and very deciduous. Petals 5, 6, or sometimes 7, apparently white, about twice as long as the calyx. Stamens scarcely as many as petals, with very short anthers. Style short, with 3 linear stigmatic branches. Capsule about 1 line long, globular-conical, black, smooth and shining, and usually indehiscent. Seeds numerous, brown, very small and obovoid.

W. Australia. Swan River, *Drummond*.

16. **C. pygmæa**, *F. Muell. Fragm.* i. 175. A very small annual, with numerous decumbent or erect stems, often under 1 in. and rarely exceeding 3 in. Leaves from oblong to ovate, thick and succulent, the radical ones not exceeding 5 lines and the stem ones usually 2 to 3 lines long. Racemes short and dense, with the bracts mostly leafy but small. Flowers small, on very short pedicels. Sepals succulent, obtuse, about $1\frac{1}{2}$ lines long, or sometimes much larger when in fruit. Petals usually 5, 6, or 7, narrow, rather longer than the calyx. Stamens varying in number, usually 2 or 3 more than the petals, and connected in a ring at the base; anthers short. Style divided to the base into 3 long, linear, stigmatic branches. Capsule globular or ovoid, cartilaginous, very smooth and shining, and often black, the valves opening only very shortly at the top. Seeds small, minutely pitted.—*Talinum nanum*, *Nees*, in *Pl. Preiss.* i. 246.

Victoria. Moist rocky or sandy places in the Grampians, Mount Abrupt in the Tatiara country, Port Phillip, etc., *F. Mueller*, *Adanson*, and others.

S. Australia. Lynedoch Valley, *F. Mueller.*

W. Australia. Swan River, *Drummond, Preiss, n. 1930*; Vasse river, *Oldfield.*

3. CLAYTONIA, Linn.

Sepals 2, persistent. Petals 5, hypogynous. Stamens 5, opposite the petals and adhering to them at the base. Ovary free, with few ovules; style 3-cleft or 3-furrowed at the top. Capsule globular or ovoid, opening in 3 valves. Seeds reniform or orbicular, flattened. Embryo curved round the albumen.—Annual or perennial herbs, usually glabrous and somewhat succulent. Radical leaves petiolate, the stem-leaves alternate or opposite, without stipules. Flowers in terminal racemes or cymes, rarely solitary.

The species are all North American or North-East Asiatic, with the exception of the following one, which is confined to Australia and N. Zealand. The genus is chiefly distinguished from *Calandrinia* by the stamens constantly of the same number as and opposite the petals, a character generally accompanied by a marked difference in aspect.

1. **C. australasica**, *Hook. f. in Hook. Ic. Pl. t. 293, and Fl. Tasm. i. 144.* A small tufted plant, with a creeping stem not exceeding a couple of inches in dry places, lengthening out to a foot or more in water. Leaves alternate, narrow-linear, obtuse, from $1\frac{1}{2}$ in. in the small plants to 2 or 3 in. in the aquatic ones, usually narrowed below the middle, but with a widened sheathing base often scarious on the edges. Flowers white and large for the genus, terminal or leaf-opposed, solitary or 2 or 3 in a loose raceme, on long pedicels. Sepals small, orbicular. Petals several times longer, obovate-oblong. Style-lobes filiform. Capsule about as long as the calyx. Seeds usually 3, black, smooth and shining.—*F. Muell. Fragm. iii. 89.*

N. S. Wales. Valleys of the Blue Mountains, *A. Cunningham.*

Victoria. Very common in rich soils and marshy places ascending to the summits of the Australian Alps, *F. Mueller.*

Tasmania, *R. Brown,* common in moist places throughout the island, ascending to 4000 ft., *J. D. Hooker.*

S. Australia. Rivoli Bay, *F. Mueller.*

W. Australia, *Drummond, n. 220, Oldfield.*

The species is also found in New Zealand.

4. MONTIA, Linn.

Sepals usually 2, persistent. Petals hypogynous, united in a 5-lobed corolla, split open on one side. Stamens 3 or rarely 5, inserted in the top of the corolla-tube. Ovary free, with 3 ovules. Capsule globular, opening in 3 valves. Seeds nearly orbicular. Embryo curved round the albumen.—A small annual. Leaves mostly opposite, without stipules. Flowers very small.

The genus consists probably of a single species, although some of its most marked varieties have been raised by some authors to the rank of species.

1. **M. fontana**, *Linn.; DC. Prod. iii. 362.* A little glabrous, green, somewhat succulent annual, forming dense tufts from 1 to 4 or 5 in. high, the stems becoming longer and weaker in more watery situations. Leaves opposite or nearly so, obovate or spatulate, from 3 to 5 or 6 lines long. Flowers solitary or in little drooping racemes of 2 or 3, in the axils of the

upper leaves, the petals of a pure white, very little longer than the calyx. Capsules small.—Hook. f. Fl. Tasm. i. 144.

Tasmania. In springs on St. Patrick's River at an elevation of 1500 ft., abundantly, *Gunn.*

The species is common throughout Europe, in Northern Asia and N.W. America, and thence down the Andes to Australia, America, and in New Zealand, but not in central or tropical Asia, nor, as far as hitherto known, in any part of Africa except Algeria.

ORDER XVIII. ELATINÆ.

Flowers regular, hermaphrodite. Sepals 2 to 5, free, imbricate in the bud. Petals as many, hypogynous, imbricate in the bud, occasionally wanting. Stamens as many or twice as many, hypogynous, free; anthers 2-celled. Torus small, without any disk. Ovary free, with as many cells as there are sepals; styles as many, free from the base, with terminal capitate stigmas. Ovules several in each cell, attached to the inner angle, anatropous. Capsule opening septiciidally, the valves flat or concave, with the margins inflexed, leaving more or less of the dissepiments attached to the central column. Seeds straight or curved, testa crustaceous, usually wrinkled or ribbed, albumen none or very thin. Embryo filling the seed, cotyledons short, radicle next to the hilum.—Herbs or low undershrubs, aquatic, creeping or diffuse. Leaves opposite or rarely verticillate, entire or serrate. Stipules in pairs. Flowers small, axillary, solitary or in clusters or cymes.

A small Order dispersed over nearly the whole globe, allied to *Hypericinæ* and *Caryophyllæ*, but differing from the former in habit, in the stipules, and in the perfectly isomerous flowers, from the latter chiefly in the ovary and fruit and want of albumen to the seeds; there is also considerable affinity, especially in habit, with *Lythraceæ* and *Crassulacææ*. The only two genera of the Order, both of them of wide geographical range, are represented in Australia.

Sepals membranous, obtuse. Capsule membranous. Glabrous, aquatic or creeping herbs. Flowers 2- to 4-merous	1. ELATINE.
Sepals herbaceous in the middle or keeled, acute. Capsule almost crustaceous. Herbs or undershrubs. Flowers usually 5-merous, rarely 3- to 4-merous	2. BERGIA.

1. ELATINE, Linn.

Flowers 3- or 4-merous, rarely 2-merous. Sepals membranous, obtuse, not keeled. Ovary globular. Capsule membranous, the dissepiments either disappearing or remaining attached to the central column.—Small glabrous herbs, either aquatic or creeping on mud. Leaves opposite or verticillate. Flowers usually solitary in the axils, and very small.

The genus is widely dispersed over the temperate and subtropical regions of the globe. The Australian species is considered by some as endemic, by others as identical with an American one.

1. *E. americana*, Arn. in *Edinb. Journ. Nat. Sc.* i. 431, var. *australensis*. A small, tender, glabrous annual, prostrate and creeping over mud in dense tufts, sometimes not 1 in. in diameter, sometimes extending over a considerable surface. Leaves in the ordinary form ovate, obovate, or broadly oblong, 2 to 3 lines long, thin and of a bright green; but in some luxuriant



specimens ovate-lanceolate or oblong, and exceeding $\frac{1}{2}$ in., almost always bordered by a few distant glands. Stipules very minute and deciduous, or rarely more persistent, and $\frac{1}{2}$ line long. Flowers very minute, sessile and solitary in one axil only of each pair of leaves, and in Australia almost always 3-merous. Sepals usually very minute and transparent, and the petals so very small and fugacious as to be rarely found in dried specimens, except in some western ones, where the petals are reddish and fully $\frac{1}{2}$ line long. Stamens 3. Ovary depressed-globular, with 3 cells and 3 minute, punctiform, almost sessile stigmas. Capsule often 1 line in diameter, the dissepiments sometimes complete, sometimes obliterated at maturity. Seeds cylindrical, more or less curved or nearly straight, marked with longitudinal furrows and minute, transverse wrinkles.—Hook. f. Fl. Tasm. i. 47; *E. minima*, Fisch. and Mey. in Linnæa, x. 73; F. Muell. Pl. Viet. i. 195; *E. gratioloides*, A. Cunn. in Ann. Nat. Hist. iii. 26.

Queensland. Brisbane river, *F. Mueller*.

Victoria. Muddy places and margins of still fresh-waters, sparingly distributed over the colony, *F. Mueller*.

Tasmania. Marshes in the northern and central parts of the island, *J. D. Hooker*.

S. Australia. Lake Torrens, *F. Mueller*.

W. Australia, *Drummond*, n. 604, 605, 684; Murchison river, *Oldfield*.

This plant, whether a distinct species or a variety of the N. American one, is found also in New Zealand and the Fiji islands, and is very variable. In the majority of specimens from various localities, I have always found 3 very thin sepals and 3 stamens, but have failed to detect the petals even in a very early stage. Amongst them Drummond's n. 605 are remarkable for the large size of the capsules: some of Gumm's, from a lagoon at Georgetown, where they are under water, and Drummond's n. 684, probably also from under water, have elongated stems and leaves 6 to 9 lines long; F. Mueller's, from the Brisbane river, have also long leaves and remarkably large stipules. A western specimen in Herb. Hooker, from Drummond, differs still more in the well-developed red petals, of a firm consistence and remaining long persistent. The N. American plant (*A. Gray*, Gen. III. t. 95) differs chiefly in the flowers almost constantly dimerous, which does not occur in any southern specimens I have examined.

2. BERGIA, Linn.

Flowers 5-merous, or rarely 3-4-merous. Sepals herbaceous or keeled in the centre, acute, usually membranous and transparent on the edges. Ovary ovoid or globular. Capsule somewhat crustaceous, the valves sometimes induplicate on the edges and carrying off nearly the whole of the dissepiments, sometimes nearly flat, leaving more or less of the dissepiments attached to the axis.—Herbs or undershrubs, prostrate or much branched, often pubescent. Leaves opposite, entire or more frequently serrate. Flowers axillary, solitary or clustered in cymes, small, but usually larger than in *Elatine*.

The genus is widely distributed over the warmer regions of the globe. F. Mueller proposes to unite it with *Elatine*, but slight as are the characters, they are accompanied by a very decided difference in habit, and the two genera are therefore natural. Of the three or four Australian species two are endemic, but nearly allied to corresponding S. African ones, a third *B. ammannioides*, is a common Asiatic and African weed, of which the fourth may be a mere variety.

Flowers small, clustered in the axils. Stamens of the same number
as the petals and sepals.

Stems pubescent 1. *B. ammannioides*.

- Stems quite glabrous 2. *B. pusilla*.
 Flowers solitary, pedicellate. Stamens twice the number of the
 sepals and petals.
 Erect annual. Pedicels elongated. Filaments all equal. Styles
 short 3. *B. pedicellaris*.
 Stem woody, prostrate and tortuous. Pedicels short. Outer fila-
 ments much broader. Styles filiform 4. *B. perennis*.

1. ***B. ammannioides*, Roth, Nov. Pl. Sp. 219.** A rigid, much-branched annual, erect or decumbent, pubescent or hirsute, with spreading hairs, usually 6 in. to 1 ft. high. Leaves from oval-elliptical to oblong or lanceolate, the larger ones $\frac{1}{2}$ to 1 in., but mostly smaller, more or less serrate with mucronate or glandular teeth, narrowed at the base. Stipules lanceolate, serrate. Flowers very small, in dense axillary clusters, on very short filiform pedicels, usually 5-merous, but sometimes 4-merous or 3-merous. Sepals very narrow, acute, ciliate, about $\frac{1}{4}$ line long. Petals narrow, very thin, about as long as the sepals. Stamens of the same number as the sepals and petals. Capsule rather shorter, the boat-shaped valves separating septically so as to leave the axis almost wholly without any remains of the dissepiments. Seeds very small, ovoid, nearly straight.—*Elatine ammannioides*, Wight, in Hook. Bot. Misc. iii. 93, t. 5; Wight, Ill. t. 25a; F. Muell. Fragm. ii. 147.

N. Australia. Gravelly bed and banks of Victoria river, Sturt's Creek, and their affluents, *F. Mueller*.

Victoria. Junctions of the Darling and Murray rivers, *F. Mueller*.

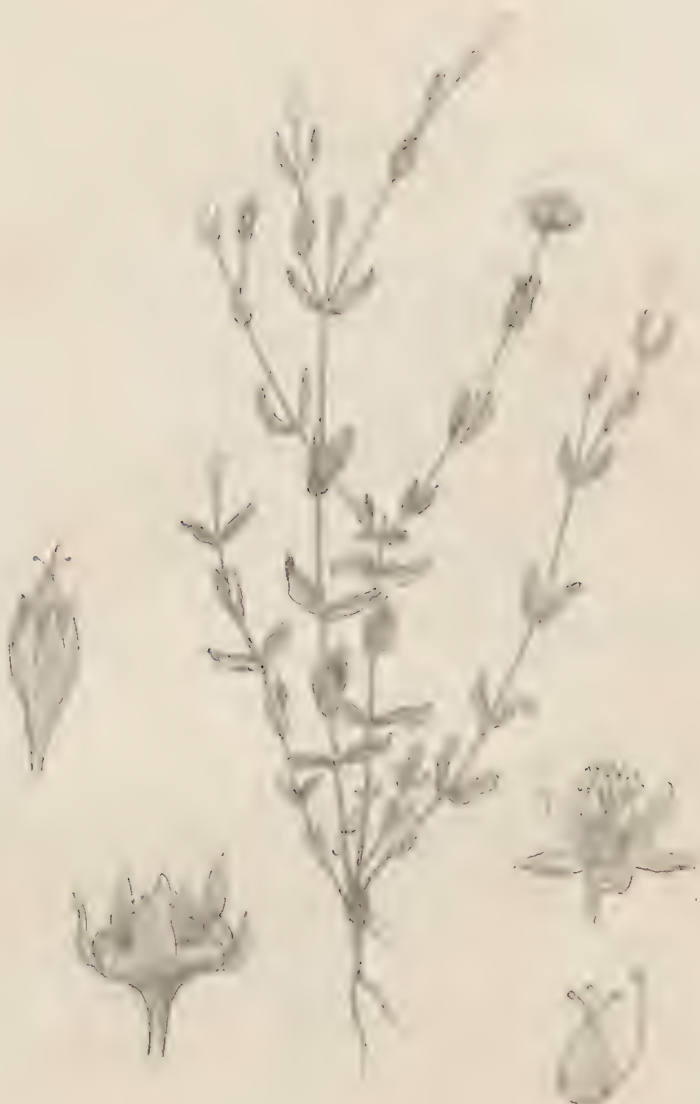
The species is common in East India and the warmer regions of Africa.

Var. *trimeræ*. Usually more procumbent and smaller. Flowers small, 3-merous or 4-merous.—*B. trimeræ*, Link, in Linnaea, x. 74; *B.* (or *Elatine*) *tripetala*, F. Muell. Pl. Viet. i. 196, t. 9. The small Victorian specimens from Dr. Mueller in Sonder's herbarium agree precisely with some Indian ones, very properly included by Wight in the *B. ammannioides*.

2. ***B. pusilla*, Benth.** This may be a variety only of *B. ammannioides*, but it has a different aspect from any of the forms assumed by that species in India and Africa. It is perfectly glabrous, with numerous slender stems, 1 to 2 in. high, thickened at the base, with a few obovate leaves, the upper leaves oblong-lanceolate and serrate. Flowers small, axillary, and clustered, as in *B. ammannioides*, but usually more sessile and 4-merous, rarely 3-merous; sepals more acuminate. Capsular valves apparently less folded, leaving a thicker central axis.—*Elatine verticillaris*, F. Muell. Fragm. ii. 148.

N. Australia. Roper river in Arnhem's Land, *F. Mueller*. The East Indian *B. verticillata*, Willd., is a very different species.

3. ***B. pedicellaris*, F. Muell. Herb.** A more or less glandular-pubescent annual, about $\frac{1}{2}$ ft. high, erect or with decumbent side-branches. Leaves elliptical or lanceolate, mostly acute, minutely serrate, narrowed at the base, the larger ones above 1 in., but mostly under $\frac{1}{2}$ in. long. Stipules narrow. Pedicels solitary, slender, longer than the leaves. Flowers 5-merous, much larger than in the preceding species. Sepals keeled, 1 to $1\frac{1}{2}$ lines long. Petals ovate-lanceolate, persistent, about as long as the sepals. Stamens usually 10, the filaments very thin, slightly dilated and closely pressed round the ovary up to the middle. Styles short. Capsule depressed-globular, 5-valved, leaving very little of the dissepiments attached to the axis. Seeds



Hypericum ciliatum Vol 1, p 182

very numerous and minute, quite smooth unless seen under a very high magnifier.—*Elatine pedicellaris*, F. Muell. Fragm. ii. 145.

N. Australia. Carcening Bay, N.W. coast, A. Cunningham; gravelly beds of the Victoria and Fitzmaurice rivers, and along their affluents, F. Mueller. The species is closely allied to *B. polyantha*, Sond., from S. Africa, which has the same styles and stamens, but is quite glabrous, with rather larger flowers on much shorter pedicels.

4. **B. perennis**, F. Muell. Herb. Stems prostrate, woody, tortuous, with very short leafy branches, glabrous or with a very few short hairs. Leaves from ovate to elliptical-oblong, mostly 3 to 4 lines long, rather rigid, glabrous and glaucous, often ciliate towards the base and narrowed into a short petiole. Stigmas lanceolate, ciliate. Flowers usually 5-nerous, on solitary pedicels, rarely exceeding the length of the leaves. Sepals broadly-lanceolate, keeled, with scarious margins, nearly 2 lines long. Petals longer, rather narrow. Stamens usually 10, the 5 outer filaments dilated, especially below the middle. Styles filiform. Capsule rather shorter than the calyx, the valves leaving much of the dissepiments attached to the central column. Seeds oblong, curved, slightly furrowed and transversely wrinkled like those of *Elatine*.—*Elatine perennis*, F. Muell. Fragm. ii. 146.

N. Australia. Banks of the rice swamps near Sturt's Creek, F. Mueller. The species is nearly allied to the S. African *B. angustifolia*, E. Mey., which is a perennial with the same styles and stamens, but its flowers are rather larger, on longer pedicels.

ORDER XIX. HYPERICINEÆ.

Flowers regular, hermaphrodite. Sepals 5, rarely 4, imbricate in the bud. Petals as many, hypogynous, imbricate and usually contorted in the bud. Stamens indefinite, hypogynous, usually united or clustered into 3 or 5 bundles; anthers 2-celled. Ovary consisting of 3 to 5 carpels more or less united, either 1-celled with the placentas on the inflexed margins of the carpels, or completely divided into cells by the union of the placentas in the axis. Styles as many as carpels, free or rarely united at the base, with terminal stigmas. Ovules usually several to each cell or placenta, anatropous. Fruit capsular, or rarely fleshy and indehiscent. Seeds straight or rarely curved, without albumen. Embryo straight or rarely curved, the radicle next the hilum. Herbs, shrubs, or rarely trees. Leaves opposite or rarely verticillate, simple and entire or with glandular teeth. Stipules none. Flowers terminal or rarely axillary, solitary or in cymes or panicles. Leafy parts often marked with glandular, pellucid, or black dots.

The Order is dispersed over the greater portion of the globe, although represented in Australia by only one or two species, and those not endemic. It is closely allied to *Guttifera* and *Penstemoniaceæ*, none of which last Order have as yet been discovered in Australia.

1. HYPERICUM, Linn.

Sepals 5. Petals 5, not woolly inside. Capsule opening septicidally. Seeds not winged. Embryo oblong or cylindrical, with short cotyledons. Herbs or shrubs. Leaves either small or thin, entire, or rarely minutely toothed. Flowers yellow or rarely white.

A large genus with nearl the same extensive geographical range as the Order.

Erect or ascending. Leaves usually subcordate 1. *H. gramineum*.
 Procumbent. Leaves usually oblong or obovate 2. *H. japonicum*.

1. ***H. gramineum*, Forst. ; DC. Prod. i. 548.** A glabrous perennial, with erect or ascending angular stems, usually about 1 ft. high, but sometimes nearly twice that height, or much shorter, slender, but rather rigid, branching at the base only or in the inflorescence. Leaves closely stem-clasping, ovate to oblong-lanceolate, obtuse, rarely exceeding $\frac{1}{2}$ in., entire, with numerous pellucid dots, the margins more or less revolute. Flowers 3 or more, in the forks or terminating the branches of a dichotomous cyme, with a pair of leafy bracts at the base of each fork; the pedicels erect and rigid, $\frac{1}{4}$ to $\frac{1}{2}$ in. long. Sepals lanceolate, acute, appressed, 2 to 3 or rarely 4 lines long. Petals entire, longer than the sepals. Stamens very variable in number, usually rather numerous and free. Styles 3, distinct. Capsule 1-celled, 3-valved, with narrow-linear placental and numerous small seeds.—DC. Prod. i. 548; Labill. Ser. Austr. Caled. 53, t. 53; Hook. f. Fl. Tasm. i. 53; F. Muell. Pl. Viet. i. 193; *Ascyron incolutum*, Labill. Pl. Nov. Holl. ii. 32, t. 174; *Hypericum incolutum*, Chois. in DC. Prod. i. 549; *H. pedicellare*, Endl. in Hueg. Enum. 12; *Brathys Billardieri* and *B. Forsteri*, Spach, in Ann. Sc. Nat. Ser. 2, v. 367.

N. Australia. Gulf of Carpentaria, *R. Brown*.

Queensland. Moreton Island, *F. Mueller*.

N. S. Wales. Port Jackson, *R. Brown*; Blue Mountains, *A. Cunningham*; Hastings and Clarence rivers, *Beckler*.

Victoria. Common in pasture lands as well as in barren localities throughout the colony, ascending to the Australian Alps, *F. Mueller*.

Tasmania. Abundant everywhere in good soil, *J. D. Hooker*.

W. Australia. Swan River, *Dummond*; Murchison river, *Oldfield*. The latter specimens remarkable for their elongated inflorescence, with the flowers mostly singly axillary along its branches.

The species in the original form, above described, is common also to New Zealand and New Caledonia. The S. African *H. Lalandii*, Chois., which has been referred to it, appears to me to differ in several respects.

2. ***H. japonicum*, Thunb. Fl. Jap. 295, t. 31.** Very nearly allied to *H. gramineum*, and considered by *F. Mueller* as a variety only. It is much less rigid and usually very procumbent or diffuse, with ascending branches, terete or scarcely angled. Leaves smaller, flatter, and more obtuse, not so broad at the base. Flowers smaller, on shorter pedicels, the sepals less acute and the petals very seldom exceeding them.—DC. Prod. i. 548; Hook. f. Fl. Tasm. i. 53; *Ascyron humifusum*, Labill. Pl. Nov. Holl. ii. 33, t. 175; *H. pusillum*, Chois. in DC. Prod. i. 549; *Brathys humifusa*, Spach, in Ann. Sc. Nat. ser. 2, v. 367.

N. S. Wales. New England, *C. Stuart*; Hastings, Macleay, and Clarence rivers, *Beckler*.

Tasmania. Abundant in billy, humid situations throughout the island, *J. D. Hooker*.

S. Australia. Torrens and Onkaparinga rivers, *F. Mueller*.

The species is widely spread over tropical and eastern Asia, extending from Japan to New Zealand.



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NEW PLANTS.

A communication from Mr. O. Tepper was read concerning some new plants. He said three plants had been mentioned as not before known to occur in South Australia; the first was a cyperaceous plant, growing in clefts of rock where a spring of water was oozing out; the long narrow leaves, 6-9 feet, growing in large tufts, gracefully draped the precipice and fallen boulders where it was found. Its scientific name was *Caladium brifidium* (F. v. M.), hitherto known from Tasmania, and occurred to the writer's knowledge only at one very picturesque spot on the Onkaparinga River south of Clarendon. The second plant was a small orchid, *Prasophyllum despectaris* (J. Hooker), which had not been known before out of Tasmania. It seemed here very rare in the scrub of the hills. The third was a *Drassea* or sundew, seemingly quite new, which sent its flower-stalk from the dry hard soil and flowered a month before the leaves appeared. Baron von Mueller considered it a close relation to,

but not identical with, *Drasera squamasa*, a West Australian species.

NOTES ON

ORCHID.

Professor TATE mentioned a small orchid forwarded by Mrs. Richards, of Fowler's Bay. It was a Tasmanian specimen (*Pterostylis mutica*), and it was strange that there should be such a wide difference in the localities.

QUARTZ CRYSTAL.

twelve months' hard labour. George Lee Way, a coloured man, was acquitted of sheepstealing. Henry Howlitt, convicted of indecent assault, was sentenced to nine months' hard labour. John Foster was sentenced to twelve months' hard labour for stealing geese. Frank Spinks, Charlotte Warner, and Ellen Kimber were convicted of robbery, with assault. Spinks received a sentence of four years' hard labour, Kimber and Warner two years each. In the matter of Michael Barratt the defendant was discharged, the Attorney-General certifying that there was no case. The Court adjourned till next day. The following cases remain on the list:—James Elliott, sheepstealing; John Lane, *alias* Jacka, rape; Joseph Collins, counterfeiting a trade mark; Frederick Edwards, absconding insolvent; and Duan Foik, attempt to murder.

THE FIRE AT MESSRS. JAMES MARSHALL AND Co.'s.—We understand that Messrs. James Marshall & Co. have not been able to arrive at a settlement with the Underwriters who had insured the stock destroyed by the late fire in Rundle-street. The claim made

10s. 1d.—CHARLES TODD, Postmaster-
will be seen, there

or half an hour to go over the rock. She was steering south-west half west. Kept her away for a short time, and hauled her up before 6 o'clock. The Board deliberated with closed doors, and deferred their decision till the next day.

PETITION TO COMMISSIONER OF PUBLIC
Several settlers situated on the

